

Merchants, Measures and Money

Understanding Technologies of Early Trade in a Comparative Perspective

Lorenz Rahmstorf, Gojko Barjamovic, Nicola Ialongo (eds)

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Weight & Value: Volume 2

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Abstract

This second volume in the series collects papers from two workshops held at the University of Göttingen in 2019 and 2020. The international meetings tackled questions related to merchants and money in a comparative perspective, with examples spanning from the Bronze Age to the early Modern period and embracing Europe, the Mediterranean, Asia and East Africa. The first part of this volume presents historical case studies of how merchants planned and carried out commercial expeditions; how risk, cost, and potential profit was calculated; and how the value of goods was calculated and converted. The papers in the second part address current theories and methods on the development and function of money before and after the invention of coinage. The introduction of balance scales around 3000 BCE enabled the formation of overarching indexes of value and the calculation of the commercial value of goods and services. It also allowed for a selected set of commodities to take on the role of currency. Around 650 BCE, this led to the invention of coinage in the Eastern Mediterranean.



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Merchants, Measures and Money
Understanding Technologies of Early Trade in a Comparative Perspective
Proceedings of Two Workshops
Funded by the European Research Council
(ERC)

Edited by Lorenz Rahmstorf, Gojko Barjamovic and Nicola Ialongo

Weight & Value

Edited by Lorenz Rahmstorf
Seminar für Ur- und Frühgeschichte
Georg-August-Universität Göttingen

Volume 2

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WEIGHTANDVALUE: Weight Metrology and its Economic
and Social Impact on Bronze Age Europe, West and South Asia

Göttingen

2021

Merchants, Measures and Money

Understanding Technologies of Early Trade in a Comparative Perspective

Edited by

Lorenz Rahmstorf, Gojko Barjamovic and Nicola Ialongo

with contributions from

Rodney Ast, Gojko Barjamovic, Alain Bresson, Georg Christ, Gareth Dale, Jan Gerrit Dercksen, Mark Gardiner, Anthony Harding, Nicola Ialongo, Carsten Jahnke, Christoph Kilger, Sibel Kusimba, Chapurukha M. Kusimba, Elizabeth Lambourn, Natascha Mehler, Claude Mordant, Rebecca Peake, Lorenz Rahmstorf, Felix Rösch, Malfalda Roscio, Clive Stannard, Piotr Steinkeller, François R. Velde, Julien Zurbach

Proceedings of Two Workshops

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The contributions to this volume have been individually reviewed by colleagues from the respective subfields to which they relate. The editors are grateful to the 19 colleagues who acted as peer-reviewers.

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Cover:

- Front cover (top left): Reconstruction of the scale from Bordjoš, Banat, Serbia, c. 1200 BC (modified after P. Medović, Die Waage aus der frühhallstattzeitlichen Siedlung Bordjoš (Borjas) bei Novi Bečej (Banat). In: B. Hänsel (Hrsg.), Handel, Tausch und Verkehr im bronze- und früheisenzeitlichen Südosteuropa. Südosteuropa-Schr. 17 = Prähist. Arch. Südosteuropa 11 (München, Berlin 1995) 209-218, here fig. 5).
- Front cover (top right): Spool-shaped balance weights with markings from Tiryns, Argolid, Greece, mid- and late 3rd millennium BC. Courtesy of Lorenz Rahmstorf.
- Front cover (upper bottom): Examples of *trientes* of the Second Punic War issue at Minturnae. Courtesy of Clive Stannard.
- Front cover (lower bottom): Gold trader's complete weighing tool kit, Bani-Shangul, Ethiopia. Donation by Per Sandvik, Vitenskapsmuseet, University of Trondheim, E 485-38 (photo: B. E. Thingstad).
- Back cover (top): Experimental leather zip pouch with fastening of leather loops and bronze baton inspired by the zip pouch found in the Middle Bronze Age Danish tomb of Hvidegård (made by Jess Paske); bone balance beam (made by Vincent Lascour) and three bronze weights (made by Aurélie Legras and Killian Morin) (© Claude Mordant).
- Back cover (bottom): The control of lengths of measurements is depicted in a 15th-century version of Jónsbók (Heynesbók) (AM 147 4to). Image provided by The Árni Magnússon Institute of Icelandic Studies, Reykjavík.

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Preface by the editor of the series

This volume presents the contributions of two further workshops which were held within the scope of the research project ERC-2014-CoG ‘WEIGHTANDVALUE’. Volume 1 in the series Weight & Value presented the proceedings of Workshops 1 and 2 held in 2016 and 2017 focussing on “Weights and their Identification” and “Weights and Marketplaces”. This volume publishes the contributions of Workshops 3 and 4. Workshop 3, “Weights and Merchants. The Technology of Early Trade”, took place between 15th-17th May 2019, Workshop 4, “Weights and Money. Understanding Money in a Comparative Perspective from Prehistory to Modern Times”, between 27th-29th May 2020. I am grateful that nearly all participants delivered a paper for the proceedings. My special thanks are due particularly to the authors of the last workshop as they had only three months to prepare the written versions of their papers. As with Volume 1, this publication is available as open access. Please note that larger, high-quality versions of the footnotes and figures printed within this volume are available for download: <https://doi.org/10.23797/9783529035418>

I would like to thank my co-editors Gojko Barjamovic and Nicola Ialongo for their support in

editing this publication. The layout of the papers and the book was again arranged by Heinz-Peter Koch. He was also responsible for solving graphical problems. Laura Hermann revised the language, Sandra Busch-Hellwig corrected formal inaccuracies. I would like to express to them and to Olaf Irlenkäufer from Wachholtz Verlag my deepest gratitude for their outstanding work. The invitation and hosting of the workshop’s participants, the printing and the open access of this publication have been financed by the ERC Grant.

The two first volumes in this series can be regarded as a *prolegomena* to the material evidence that we have focussed on in the research project: mainly weights, but also scales and weight-adjusted artefacts. In the workshops, the problems of the identification and the contextual use of these objects were discussed for the Bronze Age and later periods. In the volumes which will follow in this series, the actual data, especially the weights from Bronze Age Europe, West and South Asia, which have been investigated by the research team over the years since 2016, will be published in detail.

Göttingen, January 2021

Lorenz Rahmstorf

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Understanding technologies of early trade in a comparative perspective

by LORENZ RAHMSTORF, GOJKO BARJAMOVIC & NICOLA IALONGO

For as long as merchants have existed, such specialists in conducting commercial exchange have shared a common set of problems. They had to plan and execute trade expeditions, calculate risks, costs, and potential profit, and assess and convert the material value of goods from one to another. The chapters presented in this volume present historical case studies of how such problems were addressed.

Authors engage broadly with the tools of trade. Some contributors study the means of representing value, such as currency; ways of recording, storing and verifying information, such as technologies of counting, writing, tokens, tallies, and seals; and measuring and navigational instruments, such as maps, itineraries, and computing aids. Others pay particular attention to weights, weighing systems and weight-regulated artefacts, or explore commercial infrastructure, such as marketplaces, roads, bridges, ports, inns/caravanserais, bearers and beasts of burden, vessels and vehicles, clothing, lifting equipment, ropes/saddling, and containers, as well as the physical institutions of its management, protection and patronage. Studies in Part II have a particular focus on the role of money in trade.

Presenting cases that span the Bronze Age to the early modern period across Africa and Eurasia facilitates comparison between commercial technologies and accentuates both general and particular taxonomies and aspects of such technologies to define exemplary tool kits of traders through time and space. A few milestones merit particular mention for the fact that authors refer to them repeatedly across chapters. The invention of balance scales around 3000 BC helped in the formation of overarching indexes of value between commodities and the objective commensuration of the commercial value of goods and services. In some societies, technologies of counting and measurements, *e. g.* weight and volume, allowed a limited number of commodities to function as media of exchange. This was particularly true in the densely populated parts of Africa and Eurasia where the value of money became linked to its perceived value as a commodity. Alongside other commodities, silver and gold in particular came to function as the basis of valuation and a means of payment. Later developments include the introduction of fiat money in the early 1st millennium BC in China, the appearance of institutionally guaranteed minted currency in Western Asia in the 7th c. BC, and the gradual global abolishment of the gold standard in the 20th

century AD that separated the value of money from commodity. But their importance is mostly relevant to the scope of the discipline under which money is investigated, and they all represent simplifications of a complex problem of payment that formed only one of several technological, conventional and infrastructural challenges faced by the traders.

The chapters as a whole suggest that the hard boundaries between economic ‘formalist’ and ‘substantivist’ approaches to premodern economies from a generation ago has softened in recent years, and their relative importance now seems inversely correlated with the density of economic data available in an academic subfield. Sociologists and economists with their vast datasets rely on statistics and mathematical modelling to describe the behaviour of individuals past and present. Assyriologists and Classicists have at their disposal thousands of ancient records to reconstruct far-reaching economic practices and observe long-term processes. Prehistorians have more ambiguous material evidence to track ancient patterns of behaviour; their data tend to mould theories, with plenty of room to infer what cannot be seen directly. Exploring historical cases together, side by side, and addressing the same questions, even when there are no obvious answers, allows this volume to form a broad picture of merchants, measures and money across space and time, while simultaneously paying due attention to the specific and oftentimes unique details presented by each case.

The scholarly background and financial support behind this volume comes from the ERC-funded research project WEIGHTANDVALUE devoted to the study of metrology and value in pre-modern societies. A series of conferences organised around subtopics relevant to the overall goal of the project has brought together specialists from a wide series of academic disciplines to present historical cases and discuss their broader implications. This volume assembles 18 chapters contributed by participants in two such thematically closely linked meetings on the infrastructure of exchange and the technologies of valuation and currency. These were the third and fourth conference held under the aegis of the project, respectively.

Given their origin in the overall project funded by the ERC, meetings were somewhat loosely titled *Weights and Merchants* and *Weights and Money*. To stimulate a more uniform set of case studies, we provided contributors with a general set of

questions in advance of each meeting for them to address within the framework of their case. These original sets of questions are presented below to provide readers with a sense both of what thoughts drove us as organisers, and to see how the contributors chose to engage with those questions as applicable to their individual topics.

Part I: Weights and merchants

The catalogue of questions for the first meeting was divided into five overall sections on (1) terminology, (2) tools of exchange, (3) social and political organisation of trade, (4) infrastructure of mobility: prerequisites and physical evidence, and (5) security, risk and the legal system. Particular attention was devoted to the study of weights, weighing systems and weight-regulated artefacts, but numerous other aspects of commercial infrastructure were addressed as pertinent to the individual cases. Case studies spanning 5,000 years of history across Africa and Eurasia facilitate comparison between commercial technologies and accentuate both general and particular taxonomies and aspects of such technologies to define exemplary tool kits of traders through time and space.

1. Terminology

- Notions
What is the terminology used for the agents of exchange (traders, merchants, entrepreneurs, *etc.*, *e. g.* German: Händler, Kaufmann)? Are they differentiated in function and complexity?
- Underlying concepts
What terminology is appropriate according to your opinion?
Do you think that there is an evolutionary concept underlying these notions?
- Expeditions versus regular trade
To what extent can we differentiate, by archaeological means, between individuals who travelled to resources to obtain material for themselves, and professional traders who obtained the material from abroad for others at home?

2. Tools of exchange: Conceptual approaches and physical evidence

- General classes of tools
What basic tools were used to facilitate trade?
Is there any documentation for numbers used to document goods in transport or exchange?
Which computing aids were used? Were tallies used?
- Trade and literacy
Was writing used to document trade?

- Bulk products (volume)
What kind of transport boxes, vessels, containers were used? How were they secured?
What role did seals/sealings play?
How was volume measured? Which goods were measured by volume?
- Commodities and weight
How was amorphous material evaluated for its value?
Were scales and weights used, and for which categories of goods?
Were traders bringing weights with them during travels? Whom would such weights belong to: personal, company, institutional?
Was only one weight system in use or where several in use at the same time? Were different systems used for different goods and/or different trading partners?
Do the merchants refer to different regional metrologies? How did they convert between them?
Did the merchants verify the exactness of their weights and how?
- Currencies
Did merchants use a commonly accepted currency?
Did they use local currencies?
What role did metal (gold, silver) bullion play in the exchange?
Are weight-regulated artefacts attested?

3. Social and internal organisation

- Organisation and scale
Were merchants working alone or within an agency or company?
How were informal collaboration and formal partnerships structured?
How important were family relations within the group?
Did the merchants form a guild?
Is trade related only to states? Is trade an appropriate term for exchange in prehistoric cultures?
Does the use of certain tools (*e. g.* weights) and the presence of particular types of infrastructure by mobile individuals allow us to identify traders also in prehistoric societies?
- Gender
Were traders both male and female?
What role did gender play in the exchange and who were their partners?
- Social esteem
What position did merchants hold within society: where they fully embedded or spatially and/or socially separated? What was their standing in society? Was their profession related to a certain rank?

If the traders lived abroad and in an enclave, what was their social standing within the limits of that society?

- Temporality versus permanence
How stable was the system of trade?
What measures were taken to ensure its persistence and by whom?
- Training, qualification, aptitude
Were ancestry, aptitude, or other qualities of the individual relevant to his/her position and success in business?
To what extent were merchants trained and how?
To what extent was family relation important for education?

4. Mobility

- Mobility
How mobile were the merchants? How is this related to agency?
Were traders more mobile than other members of society?
How is this traceable – *e. g.* through written records, grave goods, isotope studies, aDNA?
Are there indications for the movement of live animals?
How regular were trading expeditions?
- Exploration
How were trade relations set up in the first place?
What comprised its exploration phase?
To what extent did merchants rely on local partners?
- Geography
To what extent was the regional geography known to the traders? Were traders explorers?
How was geography represented – *e. g.* by maps, itineraries, tallies?
What can we say about the geographies known to traders beyond the trade circuits themselves?
What distances were travelled?
What kind of measuring and navigational instruments were used?
How precise were they?
How did they measure and calculate time?
- Physical trade infrastructure
Did the traders use roads and bridges?
To what extent did they have any agency in the building of such structures, *e. g.* in collaboration with local partners?
Did they use carts and beasts of burden; where there organised caravans?
Did they pay tolls and fees; were these different from what locals paid?
Did inns, caravanserais, paddocks, animal breeding stations *etc.* exist?

Was trade protected by *e. g.* patrols, guards, fortifications?

What types of vessels were used in maritime and riverine trade?

Were any ports built? Were foreign traders allowed to use them?

Did traders build their own religious structures, such as sanctuaries, chapels, churches, mosques?

Are guild houses known?

- Storage and banking
What installations were used for storage, both for goods and tools?
Are hoards archaeologically attested? How are they explained? Can they be related to (potential) traders?
Did banks/temples/treasure houses exist?
How were they secured?

5. Security, calculation and law

- Security
What measures were taken to ensure the security of traders?
Were traders armed or even feared as warriors?
Was there any convention or law regulating the treatment of foreigners; were there regulations specific to traders?
If traders were under state-protection, what were the punishments when traders were harmed?
- Costs, risks and insurance
What was the difference between maritime and overland trade in terms of risk?
How was risk calculated? How does it relate to potential profit?
Did merchants insure their risk? Were banks, investors *etc.* involved?
- Trust and legal institutions
What role did trust play? How was trust established between partners?
What measures were taken when somebody's confidence was betrayed?
Were legally binding records used to stipulate and regulate the conduct of exchange?
Were there official and legal institutions open to litigate relations of trade and finance?

Several of the points on this list could only be addressed directly for cases in which there are eye-witness accounts written or reported. Plainly, these are lacking from all prehistoric and even from many historical cases. The effort was nevertheless to stimulate contributors working on incomplete material to think about merchants in their case within the larger framework of the meeting. Some authors chose to systematically address the points provided in the list whenever possible. Others

gave summary reflections on specific regions and/or chronological periods, and some would focus on the particular aspect of transport. The order of papers in the first half of this volume reflects this multidirectional approach with contributions presented in order of content rather than chronology of subject.

Carsten Jahnke offers an overview of the voluminous medieval trade system connecting the Western Baltic Sea region and Novgorod. The author casts the exchange as taking place between two culturally and linguistically very different regions, tracing its chronological developments, and emphasising its fluidity and adaptivity to changing political and economic circumstances. The case provides dense documentation for the commercial strategies used to overcome barriers of language, divergent institutional settings, and sometimes opposing cultural traditions between the parties involved in the trade. Jahnke traces a wide variety of approaches that developed to meet such challenges, including technological (record keeping, transportation, metrology, currency, communication), institutional (mobility, legal, security, insurance), and social (agency, intermarriage, guilds) solutions. A characteristic feature of the Hanseatic system was its high degree of reliance upon dense and trust-based personal networks of collaborators across a large geographical space. These networks allowed the head merchants to remain at home, and to direct their trade from a distance through letters. Jahnke emphasises how individual success in such a system depended on personal reputation and the ability to call in and return favours, and highlights its dispersed nature as a way to lower both risks and transaction costs, while at the same time overcoming cultural and linguistic fault lines.

Natascha Mehler and **Mark Gardiner** follow the list of circulated questions closely in their presentation of the case of medieval Iceland, *ca.* 900–1600 AD. Their discussion of trade and exchange mechanisms over the northern Atlantic is based on both written sources and archaeological data. Numerous languages (Icelandic, Danish, English, German, Latin) were spoken by merchants and clients in the system, reflecting the shifting multi-centered state system of the seven centuries in question. Multilingualism was promoted by the fact that merchants, their servants and apprentices had to, in some cases, stay in Iceland during winter, sometimes hosted by local chieftains. During the Viking Age, these chieftains regulated prices in political assemblies and used a commodity money system based partially on (hack)silver as a standard of value. Weights for measuring silver are preserved in Viking Age graves. By the 13th century, woollen cloth, and later also dried fish (stockfish), became more prevalent both as

commodities and as measures of value on Iceland, preventing coins from taking over as currency in the trade; foreign merchants were compelled to adopt the specific Icelandic commodity money system. Trade was often dangerous, and the Icelandic sagas offer ample evidence for violence and conflict; lead bullets excavated on marketplaces may support this notion. Foreign merchants followed local Icelandic jurisdiction in their interactions. Also journeys over the open Atlantic were dangerous, but as successful long-distance trade was highly profitable, merchants sought to reduce the risk and spread investment by forming alliances and joint ventures, at least during the later phases of the period under review. There are indications that also women engaged in trade ventures, for example as representative agents in the home ports.

Gojko Barjamovic traces structures and procedures of trade in Northern Mesopotamia and Anatolia in the early 2nd millennium BC. Drawing upon a large body of private commercial archives from the site of Kültepe in modern-day Turkey, he discusses the physical and commercial infrastructure and technologies used by overland traders, providing a picture of the ‘tools of the trade’ in Western Asia in the 19th century BC. The records from Kültepe document one particular trade route and its auxiliaries, which the author in turn uses to trace the existence of several other such high-intensity trans-regional commercial circuits that ultimately tied together the densely settled zones of Africa and Eurasia and allowed goods to travel in great volume over great distances, from Siberia and China to Egypt and the Aegean. Barjamovic uses the intensity and volume of commercial interaction to argue that the proceeds along the major trade routes transformed local economy, affecting not only producers, consumers, traders and transporters, but also changing societies along the major routes that provided passage, nourishment and security for the merchants. He points out that such supporting infrastructures are ephemeral in the written and material record, and yet, for the system to operate the way it did, one must necessarily infer their existence. An apparent difference between the case documented at Kültepe and the one discussed by STEINKELLER (later in this volume) appears to be the mostly private nature of large-scale commercial activities: state actors provided the necessary physical and institutional/legal infrastructure and security to allow traffic to flow in return for taxation, but they were not directly involved in commercial activities as would appear in the case of Ebla. This image may, however, be a result of the nature of the ancient data, one set coming from an institutional context, and the other for private archives, and it is not clear to what extent state actors were directly involved in either case.

Felix Rösch compares commercial and institutional developments during the Middle Ages at four trading locations of Groß Strömkendorf/Reric, Schleswig, Lübeck and Bardowick in northern Europe, which can be considered either as production sites, ports of trade, central places, or nodal points. In addition, he summarises the evidence for transport by sea and land during this period, and describes the advances in Nordic ship building. Early ports like Schleswig had a commercial waterfront design, with platforms meant to host marketplaces. In later times, the marketplace moved to the town center and trade then also took place in merchant houses. Some aspects are particularly interesting, seen in a comparative perspective. For instance, the early use of standardised weights and weight systems in the northern German/western Baltic region during the Viking Age was apparently not regulated by central authorities. It instead relied on long-lasting customary relationships between old and new trading partners, including exchange relations with the Mediterranean and Western Asia. The author also makes a case about imported ceramics, frequently found in commercial settlements. He points to an ongoing debate about whether such ceramics were imported as merchandise, used as containers, or whether they were carried along by foreign seafarers as part of their personal belongings. This mirrors a long-standing debate around foreign ceramics, frequently found in Bronze Age ports of trade and shipwrecks in the Mediterranean.

Elizabeth Lambourn opens up her contribution with an overview of current research on medieval exchange in the Indian Ocean – a field with a wide-ranging geographical scope and relying on a great diversity of sources. Formalised mercantile associations with multicultural competencies were active in the world's third largest ocean. The author focuses on the phenomenon of containerisation, observable *e. g.* through storage and transport jars apparently produced in the Guangdong province in China, but found in shipwrecks throughout the Indian Ocean littoral from the 9th century AD onwards. The volume of one ceramic vessel recovered from the Phanon Surin shipwreck is so large that the question arises as to how – if at all – large amphorae were brought in and out of the hold. Further quantitative studies of the volume of most common vessels are necessary. Also, soft containerisation in sacks in bales is documented. Of particular interest are the finds of labelled sacks reporting the name of the seller, the intended recipient, and giving general delivery instructions. Similar information also survives in the so-called *India Book*, a collection of documents from the Cairo Genizah. Inside the bales, textiles and also pepper, beads, lac, storax and other items were transported. So far, there is little evidence for standardisation of sack and bale weights but, as the author concludes, more empirical research is still needed in the area.

Anthony Harding turns to a fundamental problem of Bronze Age research: exchange and its dynamics in Europe. The material that gave name to the epoch already provides a suggestive exemplification: casting bronze often required transporting copper and tin over hundreds of kilometres. Bronze Age Europe was mostly illiterate, and even the early Greek Linear B texts offer little clue as to how exchange was organised. Hence, modelling trade draws upon a great deal of indirect evidence. Harding is concerned with the physical evidence for the movement of goods and trade-related devices and infrastructure. With the exception of weights and balances, no devices that may have facilitated such exchange appear to have survived, unless one understands the category of peculiar objects with signs (the so-called *Brotlaibidole*) as a kind of receipt produced in an exchange process. Harding primarily emphasises the importance of riverine over terrestrial routes, which would have relied on pack animals. But even the evidence of transport over water remains elusive, since direct finds of cargo ships (apart from the more common canoes) is absent so far, with the exception of a few boats uncovered in England. In this respect, the discussion of Bronze Age exchange in Europe is primarily limited to commodities and their distribution. Harding discusses two case studies: the so-called Cypriot spearheads, as a material example of the old debate surrounding contacts between the East Mediterranean and Europe, and salt, its production, trade and function as a commodity. We do not know if salt was weighed out, but Harding remarks that we so far lack heavy weights similar to the Near Eastern talent in the archaeological record of Bronze Age Europe that would allow quantification by mass of heavy loads.

Rodney Ast goes beyond the technicalities of commerce to explore an ancient entrepreneur's ties with social life, politics, and even popular culture. Starting from unpublished inscriptions found in the Temple of Isis at Berenike on the Red Sea coast, the author reconstructs the identity and business ventures of one particular merchant, Laelius Cosmus, active during the period of the early Roman Empire. Textual records show that this Cosmus (or maybe other related persons bearing the same name) led maritime trade enterprises in the port towns of Berenike and Myos Hormos. By putting together circumstantial evidence from archaeological, epigraphic, and literary sources, Ast proposes a suggestive interpretation of Cosmus's social persona. He describes a successful entrepreneur of Italian origins, possibly a freedman, as a public benefactor and important figure with prominent political acquaintances. Ast suggests that his reputation may have grown to a point where the poet Martial one generation later used Cosmus as inspiration for a personage with the same name recurring in his famous epigrams.

Claude Mordant, Rebecca Peake and Mafalda Roscio discuss the frequent occurrence of weighing equipment in cemeteries located in the Upper Seine and Yonne valleys in France. They emphasise the status of weight-bearers as warriors, but also as ‘men of science’, who would have acted at the same time as metalworkers and merchants. They suggest that the concentration of graves with weighing equipment in this particular region is related directly to its geographical position on an important crossroad. The Seine river basin is connected to the Channel and the British Isles to the northwest, to the Saône/Rhône rivers and the Mediterranean to the south, and to the Rhine river and Central Europe to the east. As a comparison, they evoke the much later situation of the large medieval fairs in Champagne held in the same region, which attracted European merchants along the same riverine routes. It remains to be proven that full-time professional merchants operated in Bronze Age Europe, but graves containing extensive evidence of weighing equipment, gold or bronze scrap and other tools are important evidence pointing in that direction. Future research on object provenance and genome of local populations may shed further light on this open question.

Piotr Steinkeller explores the outline of a very early and previously unresearched ancient network of long-distance trade. Based on records found in a palatial archive from the Syrian city of Ebla, he draws out the contours of an extensive commercial network that connected resource-producing areas and densely settled urban zones of Egypt and Western Asia in the 24th century BC. The scale and volume of this exchange points to the existence of long-established and densely trafficked routes between the multitude or relatively small states of Western Asia. The chapter dives into the mechanics of this exchange through the case of the Euphratean timber trade, in which Ebla, due to its geographical location, held an advantageous position to act as transporter and commercial middleman. The records document an intricate system in which commercial channels were kept open by diplomatic interaction, and in which a complex infrastructure of portage pathways, wagon tracks, riverine ports and protective fortresses was maintained for the systematic and large-scale logging and transport of timber. Payments are recorded in silver and gold, sometimes adding up to several tons of silver and hundreds of kilograms of gold each year. The author suggests that parts of the commercial network evidenced at Ebla must have been operational before 3100 BC, thereby implicitly linking the commercial and cultural integration of the region between Egypt and the Indus Valley to the process of urbanisation and the rise of state itself.

Part II: Weights and money

The catalogue of questions for the second of the two meetings explores notions of money across human cultures and historical periods. Some contributions were moved between the two halves of the volume, with presenters speaking at one of the meetings in the end producing chapters thematically better suited for the other part of the book. This clearly speaks to the fluidity of categories and intellectual crossover between topics. Contributions in the second part of this volume are arranged by topic and in inverse chronological order, from historical situations in which the existence of money can be taken for granted (*e.g.* the Mediterranean trade in the Late Middle Ages) to times in which this is less obvious (*e.g.* Bronze Age Mesopotamia). The intention has been to ease comparison between economic systems, both those with and without extensive use of money. Authors dealing with chronologically recent cases tend to focus their studies on social aspects of money. Authors addressing more historically remote contexts in which the existence of money is less obvious focus more on the technical properties of money. This disparity reflects a welcome shift from earlier dichotomies between substantivist and formalist approaches.

1. Core questions

- Is standard economic theory adequate in explaining the evidence of money?
- Was there economy without money?
- Are ‘primitive’ and ‘modern’ monies different?
- Is ‘primitive’ money more different from ‘modern’ money, than primitive monies are different from one another?
- Does money ‘evolve’?
- Does money have different functions in different economic systems?
- Does the structure of the economic system determine the function of money?

2. The materiality of money

- What forms can money take?
- How can we identify non-coined money in the absence of direct accounts?
- Does the form of money determine its function?
- Mass is an intuitive dimension of money, are there other dimensions?
- How many different monies coexist at a given time in a given economy?
- Are there different monies in modern economy?
- Are there differences in the circulation of different monies within the system?
- Are there goods that cannot be bought with money?
- Are there goods that can or cannot be bought with specific money?

- Are specific monies limited to sectors of the population?
- What are the differences, are they quantitative or qualitative?
- Are the standard values of different monies always reciprocally convertible?

3. Money as a unit of account

- What is the relationship between weight and face value?
- Debasement, or its contrary: Has it ever happened that the pureness of a minted money was raised?
- And if it has, then why? And what were the consequences?
- Metal money: the value of metal *versus* face value; can the value of money in its 'commodity state' be higher than its face value?
- If values are convertible, what is the difference between money and commodities? *I. e.*, if money is a commodity, can every commodity be money?

4. Money and the state

- How does fiat money come into use?
- Why do central institutions adopt fiat money? Is it always convenient?
- How does the introduction of fiat money change monetary patterns of exchange?
- Is the introduction of fiat money an 'instant revolution', or does it produce change in the long term?
- Do coins necessarily replace other forms of money stuff?
- Do states trade in non-coined money stuff?

5. Ancient *versus* modern knowledge

- How much do we understand about money? Does our knowledge develop in parallel with the functions of money, or do these functions exist in spite of our knowledge?
- What evidence is there for societies reflecting on the properties of money? – including the governing body (*i. e.*, elites, rulers, lawmakers, philosophers)? – and trade specialists?
- How did commoners and trade specialists react to changes in monetary policies?
- Are there examples of demands to change monetary policies?

6. Money, morality and social relationships

- To what extent is money impersonal and unemotional?
- What are societal attitudes towards monetary wealth?
- Is the use of money acceptable for some social groups, but dissuaded or forbidden to others?
- How are monetary transactions affected by personal ties?
- How does money affect social relationships?

Responses to these questions were produced on different levels by the authors, including more theoretical and more data-driven approaches. Christ, Kusimba and Kusimba, and Kilger originally submitted their chapters to the proceedings of the *Weights and Merchants* workshop, but given the position of money as a central part in their argument, it seemed natural to place them alongside the contributions to the second part and integrate the two broad themes within an organic scope. The result is – we believe – a stimulating diversity of approaches across the two halves of the book.

François R. Velde introduces an approach to the understanding of money grounded in his background as an economist and economic historian. His essay questions several common assumptions, introducing money as an anomaly which economic theory does not account for. Money is, as Velde puts it, not '*obvious*', but '*a problem that needs to be solved*.' The standard theory simply states that goods have prices and that goods are sold and purchased. The model does not differentiate purchases made with barter and money. Yet, even though economic theory does not predict a role for money, it is evident that money plays an important role. Therefore, Velde argues, if one aims to understand how money works, a role has to be created for it in the model. Such a role needs to work around the problem of the 'double coincidence of wants', which predicts that a transaction cannot take place if the buyer and the seller do not agree upon how the price is paid. For example, a crop farmer who wants a smartphone cannot typically buy it for wheat. The transaction does not take place, not because wheat is without value, but because the retailer knows that it will be difficult to use wheat as payment in a future transaction. The double coincidence of wants sets a limit to the viability of barter. Money provides a solution to this problem, by creating a medium that everyone wants and is willing to accept as payment.

Creating a role for money, however, is still insufficient to explain why money has value. According to the standard classification, money can derive value from political authority (fiat money), from an implicit agreement between subjects (fiduciary money), or from the market value of the substance of which it is made (commodity money). Velde, however, observes that this distinction is more theoretical than practical, and that such traits often overlap. Other papers in this book address the question of the source of money's value. Clive Stannard, for example, shows that coinage in late Republican Italy could derive its value simply from an implicit convention. Christoph Kilger, on the other hand, notes that in medieval Islamic markets, silver coins could be fragmented and circulate as commodity money. To complicate matters further, one may also consider that monies that are not inherently valuable (*e. g.* banknotes or sea

shells) have in fact the same functions of monies made of valuable materials (*e. g.* gold coins, hack-silver). Velde concludes that money has value only because people believe that it does. While the circularity of this statement at first glance may look as a resignation to an unsolvable problem, it represents the pivotal point of his argument. The key to understanding money does not reside in why we use it, but in what it does: whatever the source of its value, money has the same function. This leads to the enfranchisement of all forms of money – modern, pre-modern, pre-coinage, and prehistoric – under a single broad denomination. As the chapters by Gojko Barjamovic and Jan Gerrit Dercksen show, silver bullion and private letters of credit could be used in early 2nd millennium Mesopotamia with the same functions as later paper money. And when money is to be understood purely as a convention, then literally everything can be money, including dried fish (MEHLER/GARDINER in this volume).

In the second half of his paper, Velde argues that, while money is a viable solution to the double coincidence of wants, it is not the only one. For example, keeping a detailed account of who owes what to whom, and letting society repay debts collectively, would solve the problem of transfer as effectively as money does. Hence, money is not necessary for a society to function, and numerous societies indeed functioned without money. When money is just one of several possible solutions, then one might argue that its origin is not something that one can easily classify as ‘progress’. It simply represents ‘*the replacement of one solution by another with changing circumstances*’. Velde ends with a question: ‘Did money appear because an alternative mechanism to enable transactions disappeared, or because new opportunities arose that required a new solution?’. The author leaves the question open, hoping that an inquiry of the many appearances of money in different historical contexts may help understand what alternatives to money actually existed. The question is not only intriguing in itself; it also provides the reader with a key to approach the following eight papers of the second section of the volume.

Georg Christ addresses the Venetian pepper trade in Alexandria in the 15th century AD. He describes a fervid, international trade network connecting the Mediterranean, the Red Sea and the Indian Ocean, in which a multitude of state polities, local institutions, private associations and individual merchants held competing interests. Christ begins by following a shipment of pepper from its initial contracting in Egypt to its loading onto a Venetian galley in 1419, focussing on all the intermediate passages. He describes a seemingly chaotic system, in which a multi-layered diversity of agencies produced numerous, potential impediments to international trade in the form of

customs, taxes, contrasting laws, and different languages, metrologies, and monetary systems. One would expect – Christ argues – that this threatened international trade by increasing transaction costs and preventing market integration, and yet he finds no evidence that such complications hampered what was arguably one of the most profitable markets of the late Middle Ages in any noticeable way. The only way to explain this seemingly contradictory outcome, the author suggests, is to shift the analytical focus from the system’s mechanics to the social and behavioural dimensions of its protagonists. Based on the private archive of a Venetian merchant, he observes that traders were embedded in a network of close social relationships. Individual merchants would exchange favours, services and gifts to maintain a web of acquaintances and friendships that would provide information and help carry out their business in the most efficient way possible.

Sibel Kusimba and Chapurukha M. Kusimba address monies in pre-colonial East Africa. Their broad chronological perspective embraces the last two millennia, but has a focus on a period approximately coinciding with the modern era. The authors observe that a wide selection of different monies is documented in archaeological, ethnographic and historical records, including coins, cowries, bark-cloth, glass beads, grains, ivory pieces and brass wires. Some currencies, like coins, may have derived their value from political authority; others, like cowries, could have had their scarcity maintained by the fact that they had to be imported from coastal regions; yet others, like metal wire and bark-cloth, simply had customary value. Kusimba and Kusimba point out that several types of money were always in circulation at any given time. Even during the Axumite Kingdom (3rd to 8th century AD), when coins were minted, other monies were also in use. The study makes a compelling argument for the simultaneous use of monies that derive their value from different sources, and yet appear integrated in the same economic systems. To some extent, this makes the standard distinction between ‘fiat’, ‘commodity’ and ‘fiduciary’ monies (further explored by Alain Bresson) appear as a mere technicality, something that is not as relevant to everyday users as to a specialist scholar. The authors argue that the best way to explain the multitude of monies in circulation is to acknowledge that they are customarily accepted only because networks of merchants are based on reciprocal trust.

Christoph Kilger explores the interaction of Viking merchants in 9th-century AD Scandinavia with contemporary markets in the Islamic world, and describes the integration of two different monetary systems: one based on coins (Islamic Caliphate in Western Europe) and the other on non-coined metal (Viking economy). The aim of his

analysis is to understand to what extent the Viking merchants were knowledgeable in Islamic metrologies and monetary systems. In Viking economy, silver was the main standard of value and medium of exchange. It was traded in lumps, ingots and fragments (hence the popular term *hacksilver*) with its value assessed through weighing. Silver is perhaps the most successful metal in the monetary history of Western Eurasia, and was adopted as a standard in many economies since the 3rd millennium BC (see *e. g.* BARJAMOVIC, DALE, DERCKSEN, STANNARD, STEINKELLER, ZURBACH in this volume). *Hacksilver* and weighing equipment are a recurring feature in Viking archaeology, and testify – Kilger argues – to the relevance of monetary patterns of exchange in Viking trade. Kilger observes that Viking weight systems have several connections with Islamic metrology, which would imply that Viking merchants were able to interact with their counterparts from the Caliphate based on common knowledge. He further notes that inscriptions recurrent on Caliphate coinage are sometimes reproduced on Viking weights, suggesting that the Viking merchants were able to correctly interpret the denominations of such coins. Kilger concludes that Viking merchants possessed the knowledge to interact with Arab merchants as their peers. The case study is of interest for the scope of this book, as it provides an opportunity to address the alleged difference between ‘monetary’ and ‘pre-monetary’ economies in the historical record. It shows that problems largely stem from the criteria one lays down for identifying money, and which kind of medium of exchange is prevalent in any given economy. There is often ambiguity about what is ‘monetary’ and what is ‘pre-monetary’ grounded in objectivised ideas of money, and we instinctively tend to associate money with physical objects and recognisable shapes. In the case of early Eurasian history, such a shape is usually that of a coin. Hence, it is frequent in archaeological and numismatic literature to label every form of money that predates the invention of coinage (*i. e. ca.* 650 BC; see DALE, BRESSON, ZURBACH in this volume) or even systems that somehow are thought to ‘resist’ its introduction, as ‘pre-monetary’. The ambiguity is probably further heightened by linguistic factors, such as the terminologies in languages where the term for ‘money’ and ‘coin’ are the same (*e. g.* Italian: *moneta*; Spanish: *moneda*). However, Kilger exposes the pitfalls of such ambiguities when money becomes defined by function and his case rejects any sharp distinctions. Labelling an economy that has various media of exchange and is integrated with a coin-based market system that exists almost two millennia after coins were first invented as ‘pre-monetary’ raises serious issues. Viking and Caliphate economies were of course structured in very different ways, but those differences are not to be sought in the presence or absence of monetary patterns of exchange.

Clive Stannard quantifies the bronze coins recorded at Minturnae and Pompeii from the 2nd and 1st centuries BC, to find that only a minority of them came from standard Republican mints. Most are local ‘informal’ issues and imported foreign coins. In order to explain this fact, Stannard argues that a shortage in the supply of ‘small change’ (*i. e.* bronze coins) from the central mints threatened the development of local markets in Campania during the last two centuries of the 1st millennium BC. In order to solve the problem, local authorities responded by striking ‘informal’ coins and by importing large amounts of bronze coins from foreign polities. In order to grasp the relevance of Stannard’s contribution, one must first consider that the Late Republican monetary system consisted of two types of currency: an ‘expensive’ currency (*i. e.* silver and, in lesser amounts, gold coins) and a ‘cheap’ currency (*i. e.* bronze coins) that Stannard calls ‘small change’. The former was used in big transactions, was mostly accessible only by the wealthiest members of society, and had a long-range circulation. The latter was widespread, employed in petty everyday transactions (*e. g.* to buy groceries), and its circulation was largely limited to local markets. Stannard describes a situation in which the general level of wealth of the population could theoretically grant the satisfaction of everyday needs, and yet there was not enough small change in circulation to carry out the transactions that would have been required to grant such satisfaction. As suggested by Velde in his paper, money is not necessary to allow economic systems to function and alternative systems that permit transfers of value do exist. However, by all evidence, the Campanians ruled out other options and resorted to other stratagems to ensure that coins would keep flowing throughout the system. One could argue that Italic communities were so accustomed to the use of coined money that finding alternative ways to supply small change was more convenient than transforming the entire exchange system. The evidence, however, raises the question of how and why such a large amount of informal and foreign coins could be acknowledged to hold formal value in Campanian markets. As the author observes, the value of small change was not tied to the authority of the issuing institution, or else informal and imported coins would not have been so widely used. It was not even correlated to the market value of the metal of which the coins were made, otherwise the monetary patterns of exchange would have reverted to the circulation of non-minted bronze. Ultimately, the value of small change was only correlated to its capability to fulfil the satisfaction of buyers and sellers in small transactions in local markets. In economic jargon, the general satisfaction that derives from a transaction is commonly called ‘utility’, hence bronze coins possessed what Stannard defines as ‘*utility value*’.

Alain Bresson further elaborates on the central problem of the source of the value of money, questioning the mainstream narrative according to which metallic currencies would evolve from primitive forms of commodity money into more advanced fiat money. Economic historians often distinguish between three main types of money, 'commodity money', 'fiat money', and 'fiduciary money'. While their function remains the same, they differ in how their value is determined. When a currency is made of a material with a relatively high market value (*e. g.* a silver coin), the exchange value of that currency in its 'money-state' can be correlated (although not necessarily equated) to the market value of that same material when it is exchanged as commodity. On the other hand, the value of fiat money can be much higher than the intrinsic value of the material of which it is made, simply by decree of a political authority (*e. g.* a 500 € bill) as implied by the term *fiat* itself (Latin for 'let it be done'). Finally, fiduciary money is a form of currency without intrinsic value (like fiat), that requires trust between private subjects, but does not necessarily imply the intervention of a political authority. One might think of checks: the seller must trust the buyer has the funds on the check and must trust the bank that issued the check to pay the amount due. As Velde points out, the distinction may not always be very sharp, especially in the case of minted commodity money. However, there is one particular aspect that sets apart commodity monies from fiat and fiduciary monies: while the value of the former is correlated to the commodity represented by the physical medium (*e. g.* a coin), the latter only relies on convention.

According to western-centric mainstream narratives, commodity money would be the first currency to appear, later to be followed by the introduction of fiat money. This scheme – Bresson notes – would be apparently corroborated by the fact that, in the western world, precious metal (*i. e.* gold and silver) was used to produce the earliest coins. Their value was in turn correlated to the value of their constituent materials in their commodity state. Bresson challenges this notion, based on documentation provided by the earliest monetization in China during the 1st millennium BC. Contrary to most of Western Eurasia, China adopted bronze coins since its earliest monetisation, and never employed precious metals in its coins. Metallurgical analyses show that the early Chinese coins contain significant amounts of lead. Interestingly, in the centuries preceding the introduction of coins, archaeological evidence in China documents the widespread circulation of money in the form of miniaturized tools made of bronze, with a similarly high content of lead. Bresson argues that, since the value of pure copper would have been substantially reduced by the addition of lead, such currencies could not have had their value tied to the price of copper in its commodity-state either. In practice,

the 'adulteration' of copper would have prevented the use of pure copper as a medium of exchange in substitution for official coins. Hence, Chinese early currencies are not proper commodity money, but are better understood as fiat or fiduciary money.

Using China as a benchmark, Bresson uses a blend of textual and archaeological evidence to look for similar patterns in monetary instruments in Europe between the early 1st millennium BC and the late 1st millennium AD. He singles out several case studies of standardised metal objects that circulated in non-coinage economies, and that are often made in alloys which would render them unsuitable as actual tools. The iron spits in Archaic Greece are presented as an emblematic example: textual sources show that iron spits were used as currency in the mid-1st millennium BC and abandoned shortly after the introduction of coins. Reportedly, the iron contained in those spits was mixed with vinegar that allegedly rendered them useless as tools and unviable as ingots. Some sources describe the use of spits as 'pure convention', which would imply that the Greeks themselves considered this form of currency more akin to fiat or fiduciary money than commodity money. Based on a rich documentation, Bresson suggests that fiduciary currencies may have existed long before political authorities officially endorsed them as fiat money. In conclusion, the origin of money as a pure convention is by no means less likely than the mainstream narrative, which describes commodity money as the progenitor of all subsequent monies.

Gareth Dale discusses the problem of economic growth in Archaic and Classical Greece and address the question of money from the perspective of its ancient users. With the invention of coinage on the Turkish Mediterranean coast, Archaic Greece is often presented as a turning point in contemporary perceptions of the 'obviousness' of money. But like Velde in his chapter on the role of money, Dale complicates this narrative by his outline of the way money and monetary wealth were debated within contemporary ancient world view. He observes that, despite its pervasiveness, the existence of money was problematized and called for moral justification. He suggests that the invention of coinage, and the 'infinite' availability of silver, provided the opportunity for limitless growth, but argues that economic growth was not actively pursued by Greek aristocrats due to a notion of monetary wealth being seen as a lesser goal than political power, prestige, and the prosperity of the *polis*. Ancient Greek authors offer a unique emic perspective on wealth, and Dale shows how economic growth, profit and money were not seen to exist in a vacuum, but were deeply intertwined with ethics and politics. On the other hand, Dale also points a warning that our knowledge of the economy of Archaic and Classical Greece relies on a severely imbalanced written record. While we know a great

deal about Greek philosophy, history and literature, almost no records of bookkeeping or accounting are preserved. This unbalance stands even more in contrast to the vast documentation coming from the Bronze Age world of Crete, Egypt, and especially Mesopotamia. As ZURBACH and DERCKSEN point out in the last two chapters of this book, both institutional and private activities were documented in a meticulous effort that simply does not survive from ancient Greece and Rome. Dale instead draws his arguments from readings of Hesiod, Solon, Aristotle, and Xenophon, among others, all of whom emphasized aristocratic ideals of society, politics, and economy that would often appear to conflict with economic reality.

Julien Zurbach looks at money in Greece during the eight centuries preceding the introduction of coinage. He takes on the difficult task of addressing a timespan for which evidence for the very existence of money is scarce and mostly indirect. The paper starts out by highlighting the contradictions of a mainstream narrative that often ‘confuses’ the invention of coinage with the invention of money. Zurbach criticises the outdated, yet still common, evolutionary paradigm that simplistically views every monetary instrument preceding coinage as primitive, “*something of a ‘not-yet-money’, a predecessor without much importance*”.

The main party of Zurbach’s contribution is devoted to the analysis of probable monetary instruments in Mycenaean Greece, based mainly on the analysis of texts written in the Linear B script. He notes that these tablets occasionally mention gold in the form of possible levies from central administrations and as a measure of debt, and suggests that gold in Mycenaean Greece may have had the same monetary use as silver in Bronze Age Mesopotamia (see BARJAMOVIC, DERCKSEN, STEINKELLER in this volume). He also suggests that gold maintained a similar status during the Iron Age, while the Archaic period saw silver take over as the main form of currency.

Zurbach addresses one of the main questions raised during the final discussion of the workshop: is the lack of direct evidence sufficient proof of the absence of money? He argues that, when written records exclusively relate to those actors who do not require direct mention of money, the absence of direct proof is misleading. The Mycenaean tablets represent an emblematic case. As Zurbach notes, contracts are absent in Mycenaean Greece. All the surviving economic texts represent unilateral accounts of purely administrative nature, and they never report on palace counterparts in transactions. As a result, the information about palatial income and expenditure is always incomplete. For example, tablets report how goods were given out by palaces in exchange for alum, but never mention the quantity of alum received. Similarly, they may report a levy in gold, but omit any information on how the gold was used. Such information – Zurbach argues – is not documented by the texts simply because it was not important to keep track of it. Hence, the elusiveness of money in Mycenaean Greece depends on the fact that the private counterparts of palatial administrations did not keep written records on their own rather than that such records have not survived or been discovered yet.

Jan Gerrit Dercksen writes about the role of money in the Old Assyrian trade as documented through the dense cuneiform records from Kültepe/Kanesh in Central Anatolia (ca. 1895-1865 BC) also discussed previously by BARJAMOVIC (in this volume). The author explores a commercial system through thousands of private accounts that document sales, purchases, investments, loans, commercial contracts and legal disputes left behind by a settlement of foreign merchants. Their archives show that silver was a primary currency used to pay for goods and services, to store wealth, to quantify prices and profits, and to repay debts. Silver performed the same range of functions that scholars commonly attribute to the coined monies appearing on the Turkish coast at least 15 centuries later.

Trade in different worlds

Trade between Western Europe and Novgorod from the end of the Viking Age to the time of the medieval Hanseatic League

by CARSTEN JAHNKE

Trade, Baltic region, Novgorod, transaction costs, institutions of trade, cultural difference

Trade between the Western Baltic Sea region and Novgorod presents a prime example of the problems that arise in the economic exchange between two culturally and linguistically very different regions. The example also shows the kind of solutions that were found. In the period between the early and the high Middle Ages, the Baltic trade was constantly adapting to changing circumstances and new institutions developed to reduce transaction costs. The following contribution can only give a modest, initial overview over the various instruments and institutions which were developed to overcome the differences between and within the trading areas.

Handel in verschiedenen Welten. Der Handel zwischen Westeuropa und Nowgorod vom Ende der Wikinger bis zu den Zeiten der mittelalterlichen Hanse

Handel, Ostseeraum, Nowgorod, Transaktionskosten, Handelsinstitutionen, kulturelle Unterschiede

Der Handel zwischen dem westlichen Ostseeraum und Nowgorod kann als Paradebeispiel für die Probleme dienen, die beim wirtschaftlichen Austausch zweier kulturell und sprachlich grundverschiedener Regionen entstehen. In der Zeit zwischen dem Früh- und dem Hochmittelalter wurde dieser Handel entsprechend den sich verändernden Gegebenheiten immer wieder neu angepasst und es bildeten sich jeweils neue Institutionen zur Verringerung der Transaktionskosten heraus. Der folgende Beitrag kann dabei nur einen bescheidenen, ersten und hoffentlich nicht zu oberflächlichen Überblick über die verschiedenen Instrumente und Institutionen geben, die zur Überwindung der Unterschiede zwischen, aber auch innerhalb der Handelsgebiete entwickelt wurden.

1. Preconditions

The Baltic Sea area during the Middle Ages was inhabited by a number of different cultures that were connected by the sea (Fig. 1). For this paper three developments are important. The first was the immigration of Slavic speakers into the area around Lake Ilmen from the AD 9th century onwards. Second was the progressive “Saxonisation” and Christianisation of the Baltic Sea area that began in the 12th century. A third shift in the system of trade occurred from the late 13th century onwards, when a network of towns with “German” law was permanently established in the region.

The migration of Slavic-speaking populations into the Ilmen region led to its assimilation with the Norse communities that moved into the area at almost the same time. The centre of *Novgorodskaja zemlja* (norse *Holmgarðr*) developed as the economical focal point of that area (DUCZKO 2004, 99-105). It had in early times served as a stopover on the way to Byzantium (HENNIG 1915/16, 8-12; VALK 2012), but it developed an economic position of its own from the 10th/11th century.

Holmgarðr is well known *e. g.* in Norse runic inscriptions:

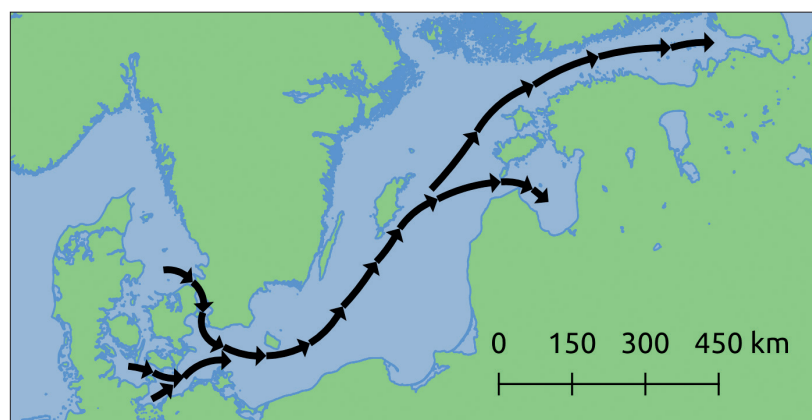
(i)nk(i)ff(a)[s]tr · l[i](t) (h)(a)ku... st(a)...n · eftiR · sihuip · fap-r · si[n · han · fial · i h]ul(m)[karpi · skaiþaR · uisi mi]þ · ski...ra

“Ingifastr had the stone cut in memory of Sigviðr, his father. He fell in Holmgarðr, the captain along with the seamen.” (SAMNORDISK RUNTEXT-DATABAS, Sö 171)

The Norse traded with and travelled regularly to Novgorod. The route became so important for trade that it even got its own name during the Viking Age: the *austr-för* or Journey to the East (see Ordbog over de norrøne prosasprog, s. v.; MÄGI 2018) – and the ships used for this voyage were called *austr-fara-krörr*.

stýrlausR · auk · bulmbR · staina · raistu · at · bryþr · sina · brau(t)u · nesta · þaiR · entapús · i · austruiki · þurkil · auk sturbiarn þiaknaR · kúþiR

▼ Fig. 1. Sea routes from the western Baltic Sea to the Gulf of Riga and the Gulf of Finland during the Middle Ages (courtesy of B. Holterman, Viabundus project).



“Stýrlausgr and Holmr raised the stones next to the path in memory of their brothers. They met their end on the eastern route, Þorkell and Stýrbjörn, good Þegns.” (SAMNORDISK RUNTEXT-DATABAS, Sö 34) (Fig. 2).

The men coming from the West to Novgorod were not only merchants, but functioned as part warriors and part traders, as conveyed *e. g.* in EGILS SAGA SKALLA-GRÍMSSONAR.

Þeir Þórólfr ok Egill váru með Þóri í góðu yfirlati, en þeir bjuggu um vart langskip mikit ok fengu menn til ok fóru um sumarit í Austrveg ok herjuðu ok fengu of fjár ok áttu margar orrostur. Heldu þeir ok út til Kúrlands ok lögðu þar við land með hálfs mánaðar friði ok kaupstefnu (EGILS SAGA SKALLA-GRÍMSSONAR, chap. 46).

“And Thoralf and Egil had a comfortable stay at Thore’s. In the spring, they built a large long ship and gathered a crew. They went on *Austrveg*, they pillaged, plundered many goods and went through many encounters. They set course to Courland, landed there and made peace (*fríði*, peace of trade) for half a month and got trading opportunities (*kaupstefnu*).”

The traveling merchant-warriors embarked together as *mötunautre* (oath groups of sailing and commensality) (PAPPENHEIM 1931, 1-20) and were organised as was customary in Western Europe into *félag* (trading/plundering-oath-groups, Germ. *Hanse*) (PAPPENHEIM 1930, 246-286, for the word *hansa* see JAHNKE 2014, 8), plundering (*herjuðu*) and trading under the “peace of trade” (*fríði*).

The progressive “Saxonisation” and Christianisation of the Baltic Sea area began from the west in the 12th century, ever increasing the numbers of Saxons and Westfalians who migrated to the Baltic area. Initially, they travelled solely as *mötunautre*. During this process, places of trade were formed into towns with German law (HIGOUNET 1990; HACKMANN/LÜBCKE 2002; HARDT 2005). In the 12th century the *mötunautre*-groups changed in character (JAHNKE 2008, 147-163, 175-181). The men from the southwest became more like merchants and less like warriors (even if they were not actually harmless). They came from the same families as the chivalric crusaders, conquering the Baltic east coast from 1200 onwards (BÜNZ 1995, 7-25; TRÜPER 2000, 520-529; JAHNKE 2008, 159-160; in press). These men became full-time *mercatores* (merchants, Germ. *Kaufleute*), accompanying their goods on the way to the East (GOETZ 1922, 31-50). The nature of the *mötunautre* changed too, from being sailing and fighting members of a crew to becoming passengers on a ship with its own permanent crew.

From the late 13th century onwards, a third shift in the system of trade occurred, when a network of towns with German law was permanently established. The merchants in these towns, to bridge the

huge gap between the different trading-places in East and West, and to save transaction costs, built a dense personal network between these places, based on trust. This network has been seen as one of the corner stones and key characteristics of the practice of new trade in Northern Europe.

The emerging area of Hanseatic trade stood in contrast to the contemporaneous network operating in Italy, the Flanders and Southern Germany (JAHNKE 2010a, 189-212; EWERT/SELZER 2015; 2016). It allowed leading merchants to remain at home, and to direct, but not control, the trade exclusively through written letters (LINDEMANN 1978). This Hanseatic trade system was based on local merchants undertaking free trade for their colleagues, while their colleagues at other locations in turn did the same for them (JAHNKE 2010a). The system which developed helped to significantly reduce transaction costs in long-distance trade.

As the western merchants established themselves in their trade network in the Baltic Sea area, the Novgorod merchants withdrew from active trade in the west. In the 12th century, merchants from Novgorod travelled *e. g.* to Slesvig (JAHNKE 2006, 258) or Stettin (CHOROŠKEVIČ 1993, 3) to trade, but by the middle of the 13th century, they with-

drew to the island of Gotland (GOETZ 1916, no. 5, 81; MARTIN 1986, 62; SCHUBERT 1993, 15), and from the end of the late 13th century to 1487 they traded only in the towns of Livonia (GOETZ 1922, 510-511; JOHANSEN/VON ZUR MÜHLEN 1973, 48-51), Finland (JAHNKE in press), Prussia and Pomerania (GOETZ 1922, 511). In 1487, they obtained permission to trade and send goods to the west on Hanseatic ships (ESPER 1966, 461), but were in reality not able to enter the Western market because of the Hanseatic network excluding foreigners. The eastern trade into Novgorod, as well as the fur-trade with the “German” merchants in the town, was, to some extent, controlled by the boyars of Novgorod, who received the goods as taxes from their lands (MARTIN 1986, 68-81, 152).

Trade in the area of the Baltic Sea and the Baltic East was ever evolving and changed from sporadic plunder-trade journeys before the 12th century to regular mutual trading expeditions in the 12th-13th century, and finally, to settled western merchants connected in commercial networks throughout and beyond the area in the 14th-16th century (JAHNKE 2016a). This gradual development was triggered by the need to reduce transaction costs and solve the challenge of multi-locality.



◀ Fig. 2. Runestone Södermanlands runinskrifter 34 (SÖ 34), Trosa-Vagnhärads, Sweden (photo by FMS and sammordisk runtekstdatabas, no. Trosa-Vagnhärads 7:1 in the RAÄ Fornsök database).

The medieval western merchants of the Baltic Sea area came mostly from merchant families. It was common to send young boys abroad to the bigger coastal towns for them to try their luck with the networks of the bulk-traders (JAHNKE 2004, 15-57). Here, they were trained by older merchants and given the chance to build their own network as a basis for their own trade (JAHNKE 2004, 15-57). The men started life as schoolboys at home (BRUCHHÄUSER 1989; CORDES 2000, 8-11), were sent abroad as youngsters, and ultimately became journeymen (CORDES 2000, 10-11; JAHNKE 2004, 15-57; 2006, 4-11). At this stage, they travelled extensively within their master's network, visiting different places and identifying opportunities of their own. Concurrently, they began to act as junior partners for their master, enabling them to earn an income of their own (JAHNKE 2004, 15-57). Later in life, when they had to establish themselves as merchants of their own accord, they would already have built considerable knowhow about the geography and opportunities of trade. Family businesses were centred on a single merchant and could therefore not be passed on to the next generation (JAHNKE 2010a, 198-205). Sons of successful merchants would, however, as a rule get a better starting position than other journeymen. Good communication and knowledge of products were always key to success.

2. Tools of exchange

Writing

Traditions of accounting were different in the Rus and in the Roman West (NOONAN/KOVALEV 2000, 121), as was the associated material culture of numeracy. For the Western long-distance traders, who used the longstanding Roman tradition of counting, record keeping was an integral tool used to document goods in transfer (YAMEY 2000). Parchment was used in the west from the 13th century onwards with the addition of paper in the 14th century (ROERIG 1959; ARLINGHAUS 2006). In the east, records were written on birch bark, attested from the 11th century onwards (NOONAN/

KOVALEV 2000; GIPPIUS 2012; SCHAEKEN 2012). Bark was used also for letters and to record economic transactions between parties, as seen in this example from the first half of the 12th century:

“... and you [two] collect; and if someone does not pay you, [you send me] news [of it] and I will send the court officials [*iabetniki*] ... and last year's and this year's ... And from the people who have arrived ... that [tribute-taxes?] has been imposed” (NOONAN/KOVALEV 2000, 148, SR no. 12).

As Noonan and Kovalev have demonstrated, debts in the Kiev Rus, like in England, were registered on split tallies (Fig. 3), *Doski-Zhereb'ia*, which required no literacy. Such tallies were also used to record taxes and other economic transactions (NOONAN/KOVALEV 2000, 131-135).

Writing became a common tool of trade from the 11th century in the East (NOONAN/KOVALEV 2000; GIPPIUS 2012; SCHAEKEN 2012) and from the 13th century onwards in the West (BRUCHHÄUSER 1989, 96-103; TOPHINKE 1999; DOTSON 2002; SCHULTE 2012), literacy among the merchants in general being restricted to their own native language (GAŚSOWSKA 2019).

For the Western traders, some ledgers, merchant letters, and custom rolls were passed down from generation to generation. Writing was initially used for accounting, mostly for trade between companies and to record debts and loans. During the later period of trade, there was a constant flow of written correspondence between stationary merchants. Writing became the main tool of trade for the Western traders in the northern part of Europe (see Fig. 4 as an example) (JAHNKE 2010a, 193-208).

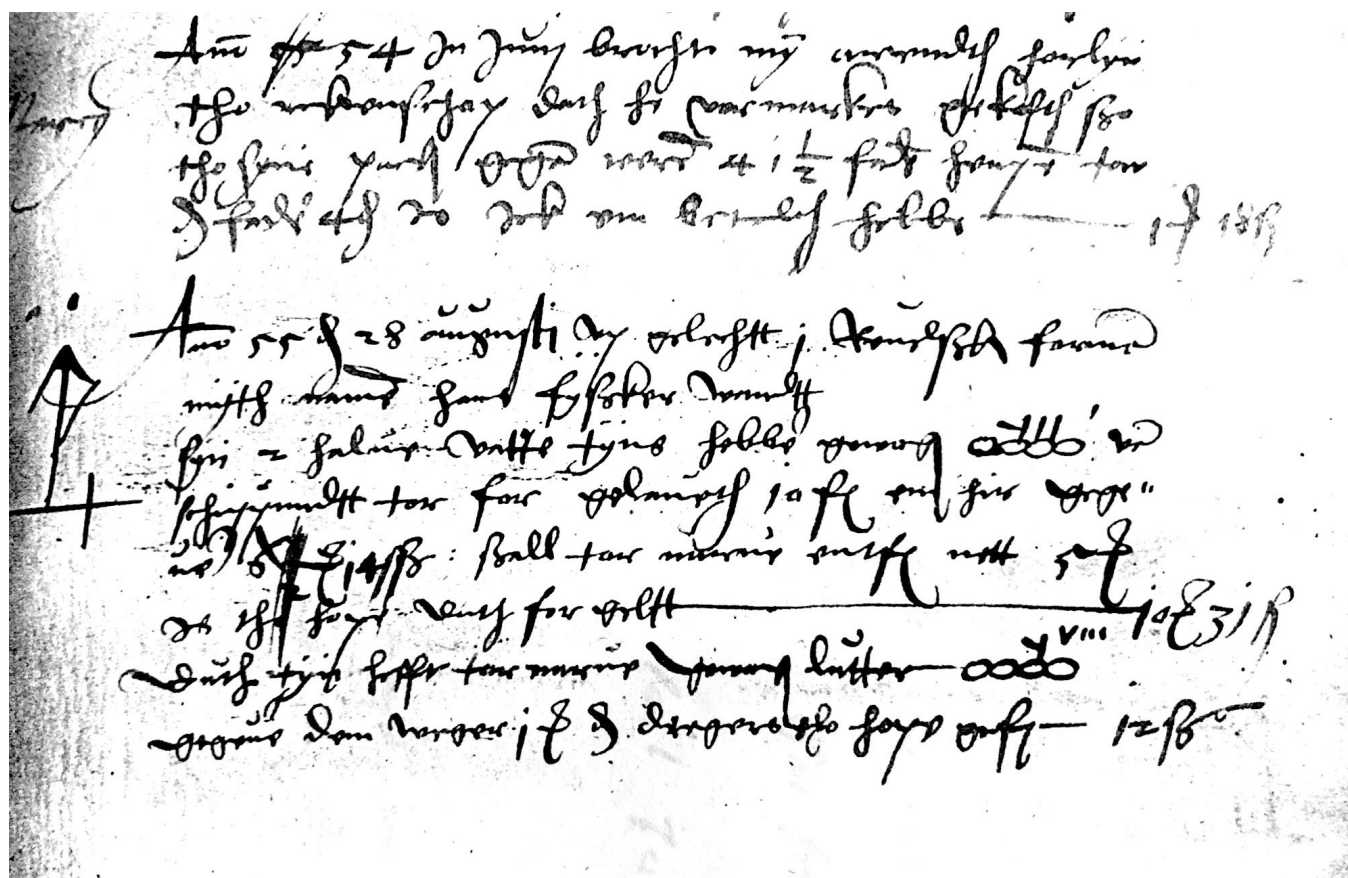
Language differences between groups was a key obstacle to trade between the Rus and the West (HARDER-GERSDORF 1998; REITEMEIER 2002; GAŚSOWSKA 2019). Old Russian was the main language of the Rus and Middle Low German was used alongside Latin as the *lingua franca* in the West from the 12th century onwards. Translation was provided with by a small number of professional interpreters (GOETZ 1922, 35, 143-144; GAŚSOWSKA 2019). Some Western merchants also went to the East to learn Russian (GOETZ 1922, 392-393; GAŚSOWSKA 2019) and some Russians mastered Low German (TIMMLER 1991; СКВАЙРС/ SKVYARS 2009). Records of fees paid for non-German speakers to learn the language are relatively common, e. g. „eynem undutssen de sprake toe leren vor 17 weken [à] 10 β”, (TALLINNA LINNAARHIIV, A.f. 18, fol. 26v.; JAHNKE 2004, 103). The language skills needed by merchants included mostly trade vocabulary and legal/documental phraseology (HARDER-GERSDORF 1998; FOUQUET 2006).

Transport in bulk

The main goods of the East-West trade were transported in barrels or in blocks and bales. Fur was one such main object in the Rus, and was being

▼ Fig. 3. Medieval split tally. The stick is notched and inscribed to record a debt owed to the rural dean of Preston Candover, Hampshire, of a tithe of 20d each on 32 sheep, amounting to a total sum of £2 13s. 4d. (Winchester City Council Museum).





▲ Fig. 4. A merchant's ledger. Extract from the ledger of the Reval merchant Tönnies Schmidt from the years 1554/1555 (TALLINNA LINNAARHIIV, A.f. 42, fol. 76v., Kaufmannsbuch Tönnies Schmidt).

delivered to the main centres of population as payment of taxes to the Boyars and others (DELORT 1978; MARTIN 1986). It was also in use as a trade good since early times. Fur and other luxury products were transported in barrels, standardised in terms of size from the 13th century onwards (KOVALEV 2002; JAHNKE 2016b). Wax was transported in blocks or slices, the *strō* (GOETZ 1922, 259-272; STÜTZEL 2013, 33-34), and cloth and linen came in bales (JAHNKE 2009b, 76-77; general: HUANG 2015). Most products that could be poured were measured in barrels (by casks or tons) using different regional units; wax was weighed in blocks; cloth and linen was standardised by production and counted per unit. Each product had its own associated measurement, either as a liquid measure, or as a standard number or regional weight of units per barrel (WITTHÖFT 1979) (Fig. 5).

In order to differentiate their own products during transport, each merchant applied a characteristic mark (Germ. *Hausmarke*) on the barrels, blocks or bales (Fig. 6). Marks were not only used by individuals, but could also represent commercial partnerships.

In the East-West trade, the majority of goods were transported by ship in summer and by sleigh in winter (DOLLINGER 1966, 44-46; BOLSHAKOV 1971; KOVALEV 2002). Transport by animal was not common, but transport by wagon was possible (GOETZ 1922, 195-245). The process of preparing the barrels or blocks for transport was highly

standardised and supervised by controllers (*Wracker*) to save on transaction costs (GOETZ 1922, 259-272). The units were also controlled on their way to the consumer by *staple cities* where merchants were forced to unload their goods and to display them for sale for a certain period.

On the rare occasion that money was transported between two places, it would typically be hidden in among other goods (JAHNKE 2006, 161-162). The western merchants tried, at least from the 14th century onwards, to handle most transfers of money using bills of exchange (JAHNKE 2006, 161-164). The trade in the East included counting and valuating in money, but merchants had to balance the trade by merchandise, knowing the *emere pro pecunia* (the buying with cash) by which they had to convert to *equum pro equo dare* (barter trade in kind) (GOETZ 1922, 355). When this was not possible, silver was the favoured medium of balance because it was also used by the Rus merchants in their trade with Persia (ATTMANN 1973, 103-193; MARTIN 1986, 81-85; NORTH 1998).

Commodities and weight

Quality and quantity assessment were always a part of trade between the Rus and the West. Fur was counted by numbers (mostly in hundreds) and evaluated by colour, species, and quality (GOETZ 1922, 248-259; LESNIKOV 1961, 222-240; DELORT 1978; JAHNKE 2015a, 220-223). Wax was weighed in standardised regional *stones* and divided



▲ Fig. 5. The cooper in an illustration from c. 1425 (*Die Hausbücher der Nürnberger Zwölfbrüderstiftung*, Amb. 317.2° Folio 11v; courtesy of Stadtbibliothek Nürnberg).

into *Last*, *Shippound*, *Liespound* and *Mark-pound* where 1 *Last* equalled 12 *Shippound* equalled 240 *Liespound* equalled 3480 *Mark-pound* (GOETZ 1922, 269, n. 5). Shipments were measured again when passing across the East-West border (Fig. 7).

Cloth and linen were counted in numbers of standardised units (JAHNKE 2009b, 76-77) defined by the region of their production. Exotic products, such as figs and rice (JAHNKE 2015b, 57-58; KARG/JAHNKE 2016, 125-128) were also counted in the units of their region of origin. Amorphous materials were defined by their overall quality and demand. White thick fur was more expensive than brown thin fur (DELORT 1978), and pure wax was more valuable than wax containing impurities.

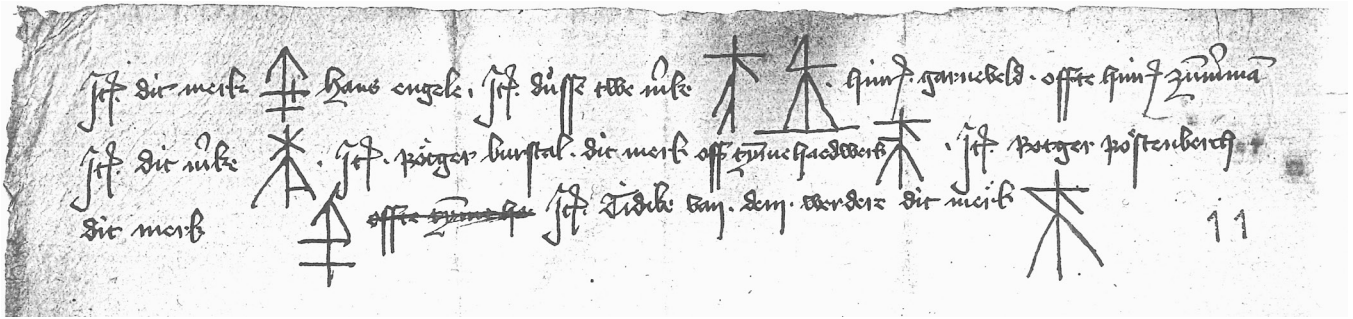
In the account shown here (Fig. 8), the Revel merchant Hans Selhorst was counting in blocks, *stro* by *shippound* and *marppound*, wax in huge casks by the *shippound*, blubber and tallow in *vate*, butter in *tons*, Swedish iron from Osemund by the *last* (12 tons each), and cow hides by the *dekker*, i. e. ten pieces each.

Regional scales and weights were controlled by municipal governments in both the East and the West. The large-scale weights and the official scales (*Ratswaagen*) of the city council were in the control of the government (EBEL 1971, 383; NOLTE 1993, 298). Smaller units and barrels had to be gauged by urban controllers (see i. a.: KRAUSE 1886; WITTHÖFT 1979, 31-63; JAHNKE 2016b, 116-117). The majority of the East-West merchants traded only in bulk and were therefore dependent on such official weights. The control of the weights by urban authorities again reduced transaction costs on both sides.

The medieval merchants in general, and those trading between the Baltic Sea area and the Rus in particular, used several systems of measurement at the same time, both for trade across cultural borders, and inside the Hanseatic network (JAHNKE 2004). The Hanseatic diet (the *Hansetag*: a council of ambassadors of the Hanseatic cities) and the regional diets tried to standardise the units for counting the most important products, such as salt, herring, wine (HELD 1918; WITTHÖFT 1979; JAHNKE 2000, 220) or beer (HELD 1918; WITTHÖFT 1979; JAHNKE 2016b, 116-117), but the results were not consistent because of regional animosities. Regional variants continued to be in use, e. g. for beer and wine (WITTHÖFT 1979, 177-187).

Even in the trade with Novgorod, the Hanseatic merchants tried to adjust the "Saxon" and Russian weights in respect to the wax trade (HELD 1918, 140-142). The *Hansetag* also tried to implement a system which would ensure that identical units of measurement were used through the entire process from initial production to end customer. One such example is the Arabic weight of a 'basket of figs' (*arroba à 2 peças*), which was in use from its source to the Prussian consumers, and by the traders to Novgorod (JAHNKE 2015b, 50-53, 57-58). Quantity was controlled by authorities in the cities and accurate weights and numbers of units were part of quality standards (JAHNKE 2000, 218-225). These again constitute part of strategies to save on transaction costs. The conversion of weights between different systems was part of a merchant's education and could be used to his advantage or disadvantage. The accuracy of measuring was verified by the municipal governments or the Hanseatic League, which instructed controllers and/or guilds to re-evaluate measurements (HELD 1918).

Quality of products was measured by urban controllers, often called *wracker* (BAASCH 1906, 79-81; SCHÄFER 1927, LXVI, 132-138; EBEL 1971, 383). Quality was highly regulated, was part of the merchant's operation, and had a bearing on the calculation of prices. Each product was rated for quality, from best to the worst (*wrakes wrack* – the name for the best quality typically depends on the good, while the term for the poorest quality is commonly applied to all goods; SCHÄFER 1927,



▲ Fig. 6. Merchant's marks. Notepad about the marks of different merchants, c. 15th century (TALLINNA LINNAARHIIV, B.b. 25, fol. 11r).

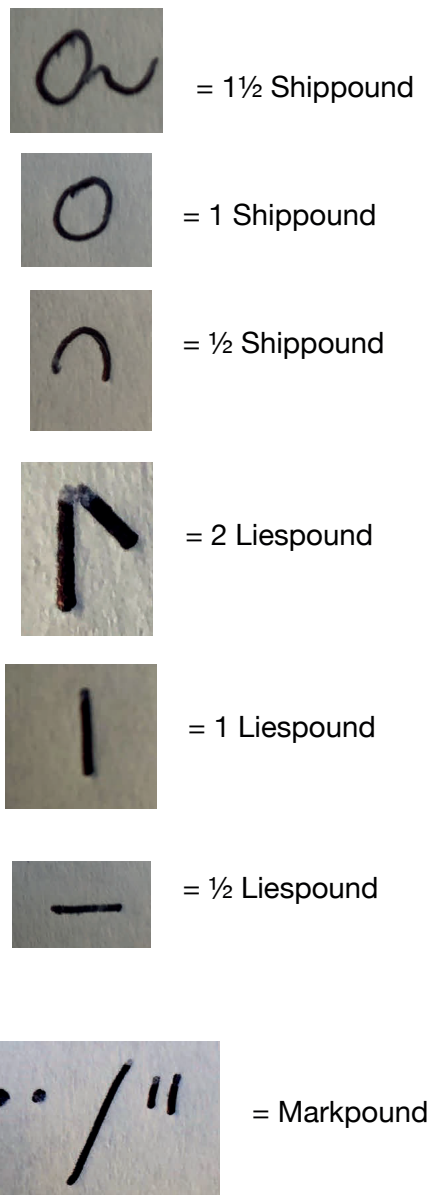
134-138). From the end of the 13th century onwards (if not earlier), merchants received at least six years' training in the different qualities and terminology (JAHNKE 2007, 4-5; CORDES 2000, 8-11).

Currencies

From the 10th to the 11th century, only proto-currencies (hacksilver) were used in the West (KILGER 2011; 2019) while a proto-currency based on necklaces (*Griwna*), marten-fur (*Kuna*) and squirrel-fur (*Ververika/Belka*) was developed in the East (ECKAUTE 1993; PAVLOVA 1994, 387-392). Parallel to this, the princes of Kiev minted their own coins 989-1018 and subsequently replaced them by Arabic dirham and Western pennies by the end of the 12th century (PAVLOVA 1994, 375-378). In the 12th century, the eastern system was transferred to a metal-based currency based on silver-bullion or ingots using the same terminology *Griwna*, *Kuna* and *Vervika* (ECKAUTE 1993, 26-28; PAVLOVA 1994, 378-381). In Novgorod, ingots were based on Scandinavian standards (PAVLOVA 1994, 379) and were reformed and reduced in the 14th century. In 1289-1291, another reform of the *Griwna* resulted in the appearance of a new form of ingot called *Ruble* (PAVLOVA 1994, 381-382). The casting of ingots in Novgorod was carried out under the control of the prince and the bishop of Novgorod, and they guaranteed the standard (PAVLOVA 1994, 382). It was not until the 1380s that the Moskovite prince Dmitrii Donskoi began to mint coins in the East again (PAVLOVA 1994, 376).

In the West, a coin-based currency based on Roman and Carolingian standards was introduced early on. Originating in England (under Danish rule at the time) and the Holy Empire, it quickly spread to the rest of the Baltic (KILGER 2000; MÄKELER 2005). Saxon merchants were trading and counting in a currency-based system, despite physical currency sometimes not yet being available. Even though merchants were counting in *Mark* (see *i. a.* KRAEMMER 2015, 113-172), the first *Mark* was minted in Lübeck only in 1506 (Fig. 9), and coins of $\frac{1}{3}$ and $\frac{2}{3}$ *Mark* since 1502 (DUMMLER 1999, 12-21). Many regions had their own currencies, but there were also integrating unions (*Münzvereine*) of currency (JESSE 1928; HESS 1971). Such unions saved some areas from devaluation, while others, mostly those areas which were under royal control, suffered severely from the

associations. Exchange rates were flexible and depended on the knowledge of merchants; they were not absolute and could be negotiated and contested (JAHNKE 2004, 172, 180-181 *et passim*).

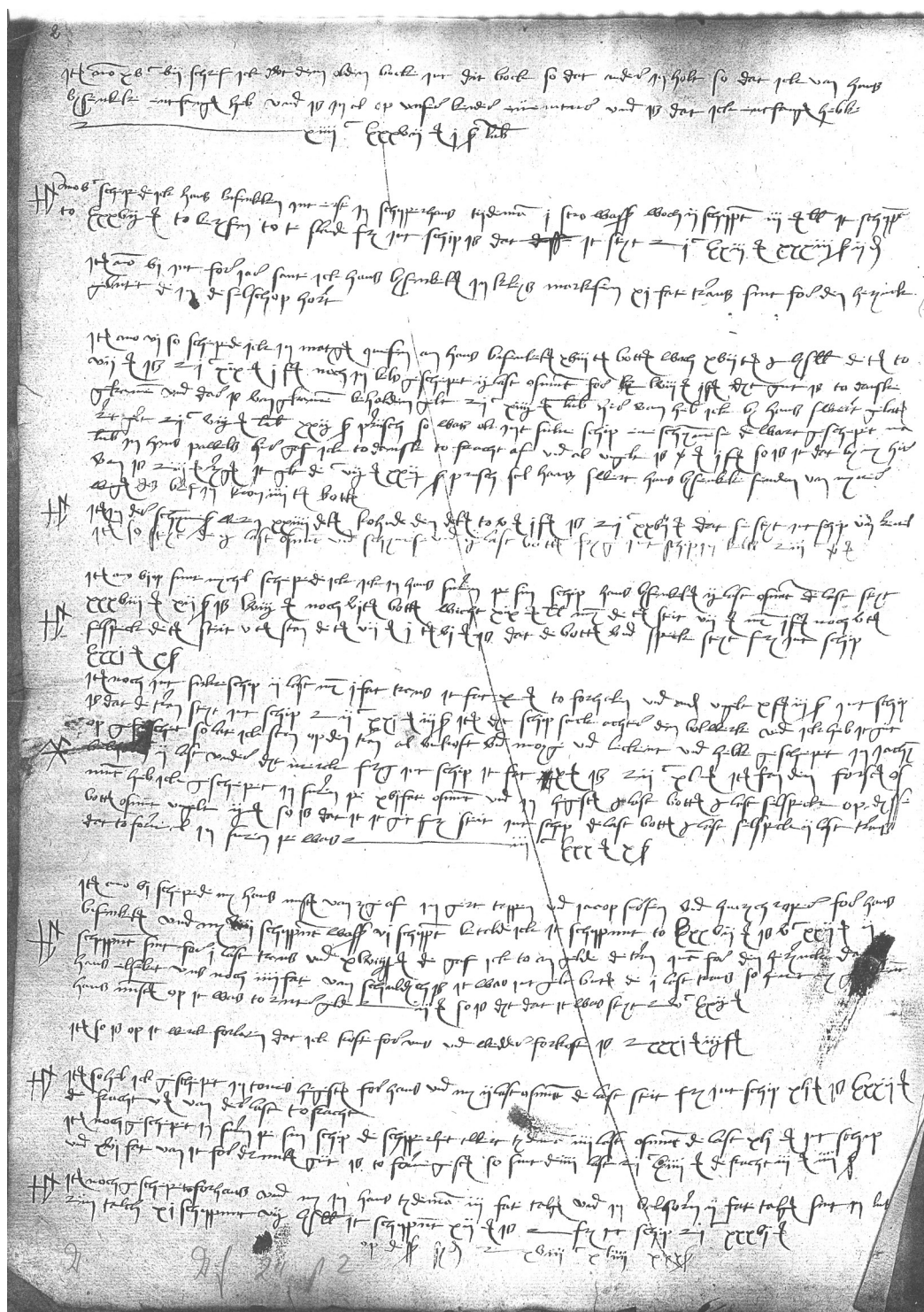


1 Shippound = 20 Liespound

1 Liespound = 16 Markpound

◀ Fig. 7. The system of stones in Reval (courtesy of F. Jahnke, Södertälje).

► Fig. 8. Part of the collection of the Reval merchant Hans Selhorst, accounting for his transactions with Hans Bissenbeke, 1505/06 (TALLINNA LINNAARHIIV, A.f. 24, p. 2).



▼ Fig. 9. The Lübeck ½ Staatsmark from 1506 (picture courtesy of the Archives of the Hanseatic Town of Lübeck).



3. The social and political organisation of trade

Organisation and scale

Early on, western merchants were organised into kinship groups or bound in corporations based on temporary oaths known as *Schwurgemeinschaften* (*selag/hansa*; JAHNKE 2013a, 5-7). From the 12th century onwards, they began to be organised in various forms of companies (CORDES 1998; JAHNKE 2013a, 6-7) and developed a network of separate single-merchant enterprises (SELZER/EWERT 2001; JAHNKE 2010a). Multigenera-

tional companies did not exist (JAHNKE 2010a, 198-200). Inside the network structure, guilds and associations played an important role in controlling and sharing information (JAHNKE 2012, 170-174; 2013b, 217-219).

Social relationships were developed in multiple ways: by kinship and marriage, by affiliation with guilds and brotherhoods, and by sending trainees to foreign merchants (JAHNKE 2004, 15-57; 2007). The system was based on trust and moderated by various institutions, such as guilds, brotherhoods or *kontors* (DAHL 1998, 272; JAHNKE 2007;

2010, 203-205). While the majority of merchants were male, some females (mostly widows) also functioned as merchants (NOODT 2003). Women played an important role in the enterprise in the hometown of the merchants, but did not normally travel.

While merchants were not legally part of statehood, urban merchants and their ideas became part of the urban government. The Saxon merchants of the 13th and early 14th century were also related to the noble families of the surrounding areas (BÜNZ 1995, 7-25; TRÜPER 2000, 520-529; JÄSCHKE 2017). They therefore acquired a certain social status and were connected to the nobility by marriage (JAHNKE 2008, 159-160; 2017). The system came to an end by the middle of the 14th century at the latest, when the nobility actively separated themselves from the merchants again.

In the Baltic Sea area and the new towns under German law up to Livonia, Saxon merchants were part of the urban and regional elites and governments from the 12th century onwards. They understood themselves as *domini* (Sires; JÄSCHKE 2017, 119-122). In some cities, they were in competition with the artisans, but were, at least in bigger towns, often able to hold a strong influence over the city councils (PUHLE 1995; ISENMAN 2003, 217-237; GILOMEN 2006, 375-383). Merchants were not segregated by law, and their ranks were open to newcomers (DÖSELER 1963; KOCH 1997). To maintain control, the merchants outside of the Hanseatic area had to reside in designated areas, the so-called *kontors* (BURKHARDT 2015). When it was not possible to maintain control abroad, the trust-based system became unsustainable due to the geographical distance between merchants.

The eastern merchants of Novgorod were in a constant power struggle with the prince and the *boyars*. Their social rank was somewhere between powerful and non-privileged (SCHUBERT 1993; IANIN 2006, 199-200), but little information about their organisations remain. In the 12th century the maritime merchants (*zamorskie kupcy*) were connected to the Friday (Market) Church, Friday being the day of trade in Novgorod (BUSHKOVITCH 1975, 21). Their most prominent members belonged to the *starejšie*, the economically and politically influential non-*boyars*, who strove to become members of the *boyar*-elite (SCHUBERT 1993, 13-14). At this time, they developed their own urban merchant ideology, which stood in opposition to the *boyars* (BUSHKOVITCH 1975). The *zamorskie kupcy* eventually disappeared, but the merchants can later be connected to the Market Church of St. John.

The merchants of the Church St. John were members of the *dives*, *žitie ljudi* (the non-noble landowners). Together with the archbishop and the Cathedral of Saint Sophia, they controlled the wax, honey and silver weight units, known as the *ell* of St. John, as well as the court of trade

(SCHUBERT 1993, 17). They thus controlled some of the most important market institutions in town (GEREMEK 1964). In the 14th century, the group of St. John's merchants developed into a closed society, with one of their members acting as representative for the *žitie* and the non-privileged, *černye*, in the Novgorod government (SCHUBERT 1993, 18; see also GRANBERG 2004, 27-28). At the same time, they developed a more conservative ideology (BUSHKOVITCH 1975, 24). From the 15th century onwards they lost their influence to the *boyars* (SCHUBERT 1993, 19-21).

The network system

The network of the Hanseatic League was set up to mediate the problem of great distances between suppliers and consumers and to save money. By using local merchants as agents without charging for the sale and purchase of goods, the Hanseatic merchants were able to trade at many places simultaneously. Local agents had the relevant knowledge of local markets, and were generally well-connected in the area. They were further able to engage other merchants for their own purpose as well. This allowed western merchants to develop an extensive network in Northern Europe, from Novgorod to England (JAHNKE 2010a; 2012). The system was in operation from the 14th to the early 16th century. Subsequently, other trading methods were developed, allowing greater flexibility, but also requiring higher risks (JAHNKE 2016a, 114-125). The stability of the system was guaranteed by the constant control inside the Low-German society, and by deliberately excluding competition from outsiders. The latter, however, was not successful.

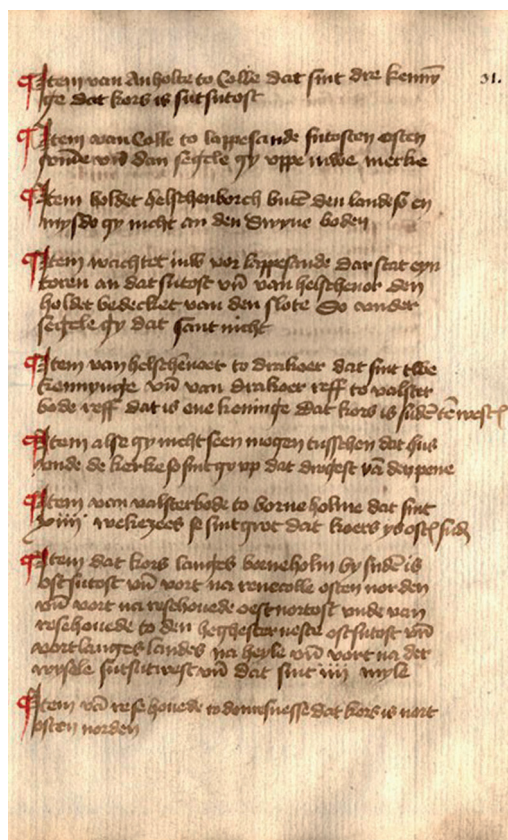
From the 13th century onwards, the merchants of Novgorod no longer travelled much in the West, but mostly sold the *boyars'* tributary goods to the western merchants in town (IANIN 2006, 196). We can speculate that Novgorod merchants were instead highly active in the eastern regions, such as the Middle Volga, Bulgar, and Nižnij-Novgorod (MARTIN 1975), but little evidence remains. For Novgorod, the eastern market proved more lucrative in the long run than the oversea trade in the Baltic Sea area.

4. Infrastructure of mobility: Prerequisites and physical evidence

Mobility

In the beginning, the eastern and western traders were faced with all the negative consequences of economical flexibility: trading at two places simultaneously is impossible when travelling by oneself (JAHNKE 2014, 97-110). When the merchants settled down in the 13th century, transport, at least in the west, was organised by third-party carriers, shippers or waggoners (MICKWITZ 1938, 143-145; NIITEMAA 1952, 153-187; AHVENAINEN 1963,

► Fig. 10. *The Rutter* (DAS SEEBUCH), fol. 31r, the entrance of the sound (courtesy of Deutsches Schiffahrtsmuseum in Bremerhaven).



120-135; JAHNKE 2001; STRAUBE 2015). aDNA analysis of human remains in medieval toilets from King's Lynn, Norfolk, and Lübeck are indicative of the vast of mobility of these merchants (FLAMMER *et al.* 2018). In the contact zones between different economical or cultural spheres, such as the Rus, the Hanseatic merchants sent some of their own to their regional *kontors*, who acted as agents for their colleagues.

The western traders had substantial control over their trading areas. A Livonian merchant at the beginning of the 16th century was able to receive relatively up-to-date information about the economic and political developments as far as Spain, France, the Netherlands, Burgundy, England, Scotland, Denmark, Novgorod and Moscow (JAHNKE 1999; 2004, 267-271; 2016, 269-270). There was a constant flow of information inside the network, continually updating information about routes and events in the whole area. The mental map of a Hanseatic merchant reached from the Rus in the East to Greenland and Norway in the North, England and Cornwall in the West and Portugal, Spain, Italy, Egypt and India in the South. The merchants rarely travelled by themselves but traded inside a long-reaching network via different substations.

The shippers of Northern Europe were not using maps, but found their way through experience and by following the coastline. Their navigation also took into account specific characteristics of the sea, such as smell, depth, and transparency of the water.

Written sailing instructions for this type of navigation survives, see for example DAS SEEBUCH (Fig. 10) (FALK 1912, 13-15).

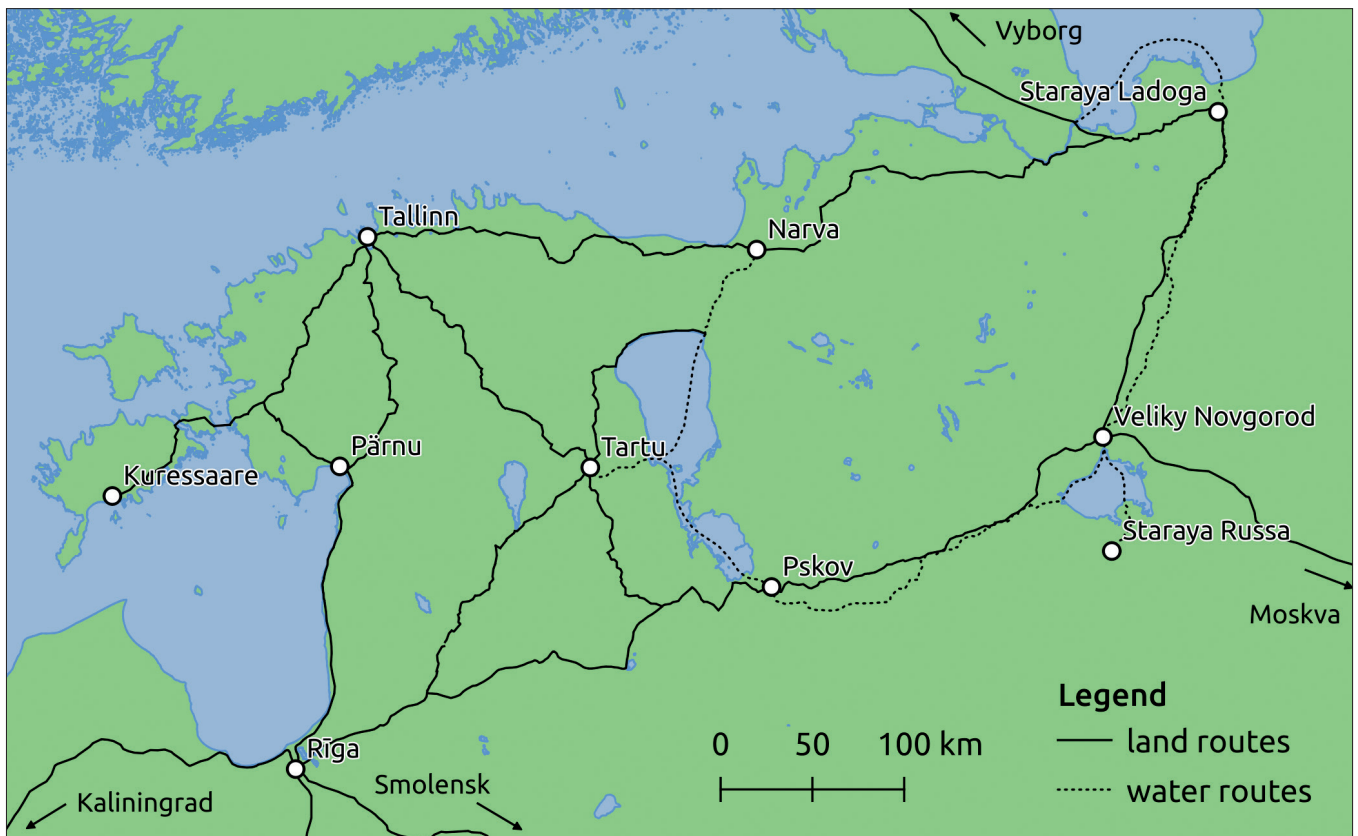
Time was, as always, one of the most challenging factors of Hanseatic trade: the first traders at a market gets the best prices. But time was also relative for medieval merchants. Land-based trade could be calculated and timed relatively precisely. Seaborne trade, however, could not be calculated or timed with certainty. For example, during the 1530s, sending a letter from Reval to Danzig could take anywhere from 30 to 65 days. From Reval to Lübeck it could take the same amount of time and more. Sailing times for a single route could vary by several months, depending on the wind and weather conditions (JAHNKE 2004, 270-271). Although merchants were used to this kind of delay, they put some of the responsibility and the blame on the skippers (JAHNKE 2001, 134-138). The most important problem, however, was the lack of a continuous flow of information. To counter this, merchants often sent the same information by different ways and on several ships at the same time in the hope that at least some would reach their recipient in time. The problem of information was also partially solved by the network itself, as a merchant would receive information from several different sources and would thus be able to validate it (JAHNKE 2004, 118-120, 271).

Because of the problems with delivery times, and the naturally occurring downtime between acquiring and selling new goods, Hanseatic merchants were often in need of interim funding. This could be provided by banks, merchant colleagues, or the friars (JAHNKE 2004, 122, 189-190). The great distances and the fluent exchange rates could be used to mask higher interest rates for credits than allowed by law or custom. Credits were a common and tolerated occurrence (JENKS 1982; JAHNKE 2006), but interest rates higher than 5 % (sometimes even 8 %) were seen as immoral (DUHR 1900; GILOMEN 1990; SIEMS 1992; RÖSCH 1994; TODESCHINI 2012).

A similar system of credits and debts is known from Novgorod and already the Arabian traveller Abū Ḥāmid al-Ġarnāṭī from the middle of the 12th century reports on the securing of debts in the Rus (BOLSHAKOV 1971, 37; NOONAN/KOVALEV 2000, 119), but no further details are known (NOONAN/KOVALEV 2000, 119-123). The discovery of many birch bark documents showing statement of debts (*dolzhnitsa*), their collection, and a witness and warrantor-system, suggests the existence of stable and sophisticated system of credit and security (NOONAN/KOVALEV 2000).

Physical evidence of trade infrastructure

Inside the Hanseatic trade area permanent and specifically developed roads were used (Fig. 11) (BRUNS/WECZERKA 1962-1968). Harbour facil-



ities, paved roads with bridges, and ferry stations were all common. Around Novgorod, in contrast, water transport and sleighs on frozen rivers were the main form of transportation for goods (STIGLBRUNNER 2012, 186-187).

To secure the most important trade routes, some of these were controlled by urban governments (*e. g.* JAHNKE 2019c, 231-234). Both in the west and in Novgorod, the main roads into and within the cities and their gates were paved with wood or stone. Rural roads, however, were not paved (STRAUBE 2015, 84-86; CARR-RIEGEL 2016). Depending on terrain, wagons, carts, riverboats, floats, sleighs, sumpters and seagoing ships were used. Occasionally, the carriers at different routes tried to monopolise their position, but this was not generally the case (EBEL 1938; PITZ 1966, 55-60). Foreigners were allowed to use trading facilities, but in exchange they had to present their goods there at a certain time. They were also normally only allowed to trade with domestic traders, and not with other foreigners (*Stapel- or Niederlagerecht*) (GÖNNENWEIN 1939; HENNINGS 1984; JENKS 1996; JAHNKE 2017).

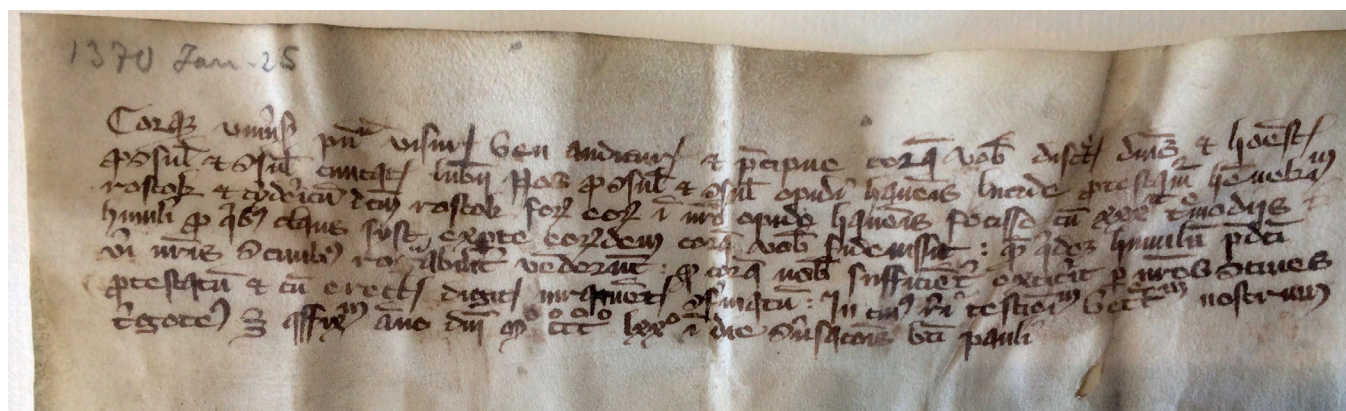
Storage facilities at harbours within the towns themselves were common (*i. a.* THOMAS/VOLKSDORF 1999, 24). The houses of the merchants in the Baltic Sea area were built to store goods in different ways, and often contained cool cellars and airy garrets (*Lübeckisches Dielenhaus*) (Fig. 12) (RIEGER/JAHNKE 2018; FINKE 2019, 131-157). A majority of towns in the West were arranged in such a



▲ Fig. 11. Land and water routes in the northern Baltic region during the Middle Ages (courtesy of B. Holtermann, Viabundus project).

◀ Fig. 12. Lübeck Dielenhaus, Fischergrube 88, in 1942, destroyed during the Second World War (courtesy of M. Finke, Lübeck).

way as to provide the best conditions for trade. In Novgorod, the situation was different. Here, the wooden houses were scattered and arranged around the so-called *ends*. Devastating city fires oc-



▲ Fig. 13. Poundtoll receipt by the city of Copenhagen for the merchants Hennikin from Rostock and Tydemann from Rostock, dated 25. January 1370 (Archives of the Hanseatic City of Lübeck, *Pfundzollquittungen*).

curred regularly, approximately every 10 to 20 years (STIGLBRUNNER 2012, 161-166) and houses were normally not built to store large amounts of goods. The Hanseatic merchants in Novgorod had to rely on the storage facilities at the *kontor*, and especially the *kontor* church, which was one of the only stone buildings in the city (JOHANSEN 1958, 500).

From 1215, the law of the Catholic Church forbade the building of religious structures in other areas of the *orbis catholicus*. Instead, foreigners had to integrate into existing parish structures (JAHNKE 2019b). The rites of the Eucharist, confession, *viaticum*, unction, and burial were exclusively performed by parish priests (BROWE 1929; 1931; 1933). Foreign merchants could use the services of the friaries, which were, to an extent, exempt from such rules. Alternatively, they could try to mark their own position inside the parish structures by sponsoring their own pews, chapels, or divine services (JAHNKE 2019b). The merchants abroad could also be integrated into the church organisation via brotherhoods or guilds (JAHNKE 2019b, III.g, 33-34).

But in the areas outside of the Catholic world, such as the Rus, Latin merchants built their own religious structures, including churches and graveyards. These institutions depended on the goodwill of the foreign rulers (JAHNKE 2019b, III.b, 15-17). Until the end of the active Russian trade in the West, the Rus merchants did the same in the Catholic world, for example in Sigtuna and Visby (JOHANSEN 1958, 512-514).

Medieval governments tried to promote trade in their areas by creating infrastructure, such as quays, dockside cranes, marketplaces, market halls and meeting rooms. They allowed also buildings to be constructed for foreign merchants (JAHNKE 2017). They further created a trade-friendly legal infrastructure with special market courts (fast courts), special judicial procedures, and the involvement of foreign merchants in market courts (SACHS 2013; CORDS/HÖHN 2018).

Merchants paid for this infrastructure by paying market customs (*foraticum*, *teloneum fori*, *palfictura*) (ADAM 1996; JAHNKE 2019a). In order for the local rulers to guarantee the safety of the

merchants, they also paid the rulers additional customs, and later in history, also tolls, such as the *portaticum* (harbor toll), *ripaticum* (payment for using and passing the (royal) strand), and *salutacium* (a type of scavage) (ADAM 1996). From the 11th century onwards, the levy of market customs (*teloneum fori*) was seen as an imperial prerogative, continuing until the 12th century at the latest (ADAM 1996, 37-39).

The concept of 'borders' as a clearly marked territorial area did not exist in the Middle Ages (SCHUBERT 1998, 5-6). Instead, areas were defined by the actual power of ruling, or by regional customs, the *Lantsit* (SCHUBERT 1998). Consequently, there were many different territories and numerous transition zones. Customs and tolls were paid at the moment of entering a new territory or market, at ports, at gates, or in marketplaces (Fig. 13). From the 13th century onwards, they could be registered in ledgers and merchants were provided with receipts. From the 14th century, merchants could organise custom payments by themselves (*Pfundzoll*) (JAHNKE 1998). Of course, smuggling and fraud also existed, known to us from the comparison of waybills to declarations of customs.

The banking system of the western Baltic area was different from that in Italy. Because of the networkstructure of the trade, merchants did not have to rely on banks to finance their activities (JAHNKE 2006). Banks are known for giro accounting and, first and foremost, for the transfer of money outside the Hanseatic area, mostly to the Curia (JAHNKE 2006, 153-157, 161-163).

Credit could be given to promote advancement of trade inside network structures, by neighbours or other colleagues and from the capital market. The friars (Dominicans, Franciscans *etc.*) would also provide credit to finance trade. The banks were protected by warrantors and trust, but, for example in Lübeck, they regularly failed (*i. a.* Godeman van Buren, 1461-1472) (JAHNKE 2006, 152-153).

Credit and rent are well-known also from the Novgorod birch bark records (NOONAN/KOVALEV 2000), but other, more detailed evidence is still lacking.

5. Security, risk and legal system

Security

Trade is heavily dependent on security; providing security in turn has a vast impact on transaction costs. The more secure a market, the higher the chance that merchants come to use it. Security in the present case was challenged in two areas: on the routes to and from markets, which had to be secured, by land as well as on the sea, and in terms of market conditions as such (legal, physical), which also had to be controlled. From the 9th century onwards, local rulers strove to improve security on the access roads to their markets. It was within this framework that the port (*havn*) as a secured trading area was first developed from simple landing places with no security provided (*anløbsplads*) (NIITEMAA 1955, 14-51; ULRIKSEN 1998; JAHNKE 2010b; 2019).

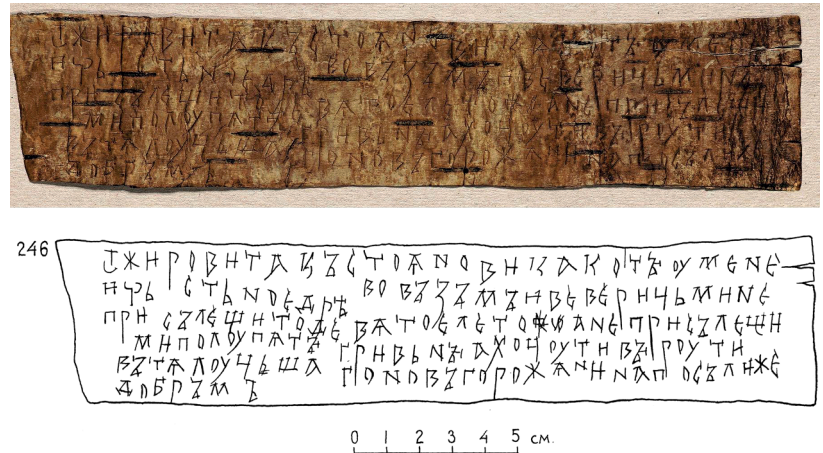
Merchants were armed at all times. Until the end of the 13th century, conflicts between merchants were occasionally resolved by force, as seen e. g. in the *Regulations of the St. Canute Guild*, c. 1200, §§ 15-16 (GILDE- OG LAVSKRAAER I, 10). During the 13th century, conflicts became increasingly formalised and pacified (HÖHN 2014; WUBS-MROZEWICZ 2017; 2018; CORDES/HÖHN 2018), but in the case of unresolved conflicts, merchants were still allowed to take up arms (*Piraten, Frieseschiffe, Fehdewesen*) (NETTERSTRØM 2007; ROHMANN 2014; 2017).

As far as we know, the trade between Catholic western merchants and Novgorod had been secured by contract at least since c. 1170 (RENNKAMP 1977, 49-50). Security and opportunities of the Western merchants in the Rus were subject to contracts, even when the legal implications of such contracts could be controversial due to cultural differences. Especially the Rus' tradition of kissing the cross (*krestnoe celovanie, крестное целование*) as a form of oath created problems (GOETZ 1922, 36 and *passim*; DEWEY/KLEIMOLA 1968; MIKHAILOVA/PRESTEL 2011; MIKA 2018).

The existence of a general *lex mercatoria* has been contested (CORDES 2003). Generally, merchants were protected by common law, and by specific regulations in the North and West. Merchants were regarded as protected by the emperor himself, as well as by market jurisdiction. The security of merchants on the road, however, remained problematic.

Contracts were enforced by a withdrawal of trust in future business affairs, and by peer pressure (JAHNKE 2007, 22-25). Groups from the same town, language area, region, or subject to the same ruler could be held collectively responsible and made liable for the actions of one member (SACHS 2013, 24-25). A birch bark record dated c. 1025-1055 illustrates the latter phenomenon (Fig. 14):

„From Zhirovit to Stoian. It is the ninth year since you swore on the cross [or took the cross] and have not



sent me the money. If you do not pay me 4½ grivnas, I will confiscate merchandise of the most distinguished Novgorodian. Please send [it].” (NOONAN/KOVALEV 2000, 142, no. 246)

Sanctions against damage caused by merchants could be imposed by local governments. This is mostly attested at Novgorod (NOONAN/KOVALEV 2000, 138-142), while sanctions were often interminable in the West and not a road to success (ROHMANN 2014).

Cost, risk and insurance

Trade between East and West in the Baltic was entirely built on market mechanisms. Profit was heavily dependent on transaction costs (JAHNKE 2004, app. I-II). Costs were reduced by network trade, but this also limited higher profits. Avoidance of risks was a cornerstone of trust building and allowed trade to flow in a safe environment at the cost of potentially increased profits (JAHNKE 2007, 4-11).

The risk of losing goods at sea was higher than on land (JAHNKE 2004, 132-136). Risk was therefore often spread out by loading goods onto different ships (FRIEDLAND 2006). The advantage of sea transport was the higher loading capacity, which to some extent balanced the higher risk. Sea-going ships also crossed fewer customs stations, thus reducing the cost of transport. On the downside, seagoing merchants would occasionally suffer total losses (JAHNKE 2004, 132-136). Profits normally had to be high enough to balance out such losses, as banks, investors *etc.* were not part of the trade. Instead, the network structure of the trade, in which the lost goods were owned collectively by several merchants, absorbed some of the loss.

Insurance against losses is attested in the Scandinavian area during the 13th century (GILDE- OG LAVSKRAAER I, St. Canuti Guild, ca. 1200, § 17, 10. Gilkær, 140) but not in the Low German speaking areas. It is unclear at present why such insurance seemingly did not exist there. Data about insurance terms of the Novgorod trade is likewise not available.

▲ Fig. 14. Birch bark document no. 246 from the City of Novgorod (© 2020 – Национальный исследовательский университет «Высшая школа экономики»; Институт славяноведения Российской академии наук).

Trust and jurisprudence

As mentioned earlier, the Hanseatic trade system was based on trust. New merchants did not have to gain trust, but they had to preserve the trust shown to them by a system of constant social control (JAHNKE 2012). It was easy to establish contacts to new trading partners, but when trust was betrayed, social consequences would follow immediately as information about the transgression flowed freely and fast within the Hanseatic network. Every merchant informed his partners in countless letters about every aspect of social life (the so called *tidinge* > *Zeitung*) (LINDEMANN 1978; JAHNKE 2016a, 119-122), ensuring that news about misconduct eliminated further possibilities of trade for perpetrators.

Hanseatic merchants could go bankrupt, as seen in the case of the well-known merchant Hildebrandt Veckinchusen in 1422 (HILDEBRANDT VECKINCHUSEN, no. 319, 337-340). As long as such misfortune was not based on untrustworthy behaviour, however, liquidation was not in itself overly problematic. While imprisoned in the Tower of Bruges, Veckinchusen wrote to ask his wife to send him his Book of Hours, his clothes with linings of beaver fur, and his fine Flemish clothes, seeing as: "I have to have (fine) clothes, because I have been in the Tower one month by now, and I shall have use for them here in the Tower" (HILDEBRANDT VECKINCHUSEN, no. 319, 337-340, here 339).

Mediation was one of the main tools of conflict resolution (HÖHN 2014; WUBS-MROZEWICZ 2017). Organisations, such as brotherhoods and guilds could mediate (GILDE- OG LAVSSKRAAER I, St. Canute Guild, c. 1200, §§ 21-22, 11), as could colleagues and regional rulers. Merchants often tried mediation before entering into long lasting and expensive legal disputes (WUBS-MROZEWICZ 2017).

Dealing with the legal systems abroad presented one of the main challenges in the development of the northern European trading system (CORDES/HÖHN 2018). Prior to the 13th century, merchants were outlawed, or subject to distinct and stricter rules than the local population. In response, merchants united into groups (*hansa*, *fēlag*), which would ensure their legal jurisdiction abroad. Members of such groups were obliged to swear an oath to one other that they would defend each other and give aid to free an imprisoned 'brother' (*Regulations of St. Canute Guild, ca. 1200*) (GILDE- OG LAVSSKRAAER I, St. Canute Guild, c. 1200, §§ 15-16, 10).

Since the beginning of the 13th century, town law systems (e. g. the Lübeck Law, the Magdeburg Law) began to dominate the Latin part of the Baltic area (JAHNKE 2009a, 58-69; LINK/WALKER 2017). Both systems ensured and regulated the rights of foreign merchants. Around the same time, merchants began to stay at home, and merchandise was

instead handled by domestic merchants. This saved on legal transaction costs.

The foreign merchants in the Rus were obliged to stay and trade in designated areas only. Such areas were governed and controlled by the privileges of the Latin merchants. They had to avoid Novgorodian courts, and privileges regulated the contact between the different law systems (GOETZ 1922, 377-381, 434).

6. The trade from Western Europe to Novgorod

The trade between Western Europe and Novgorod was made lucrative by a vast cultural and linguistic gap between the two worlds. Eastern goods were in high demand in the West, while Western goods were popular in Rus. But such differences between the two spheres also resulted in higher transaction costs. During the long-lasting trade relations between the two regions, costs were reduced by institutional development, both within the two trading areas themselves and between the Western and Eastern systems as a whole.

In the West, an institution that would eventually develop into the Hanseatic League was founded on the basis of local developments and traditions. This type of institution reduced the problems and costs of multilocality, security and standardisation. Merchants held influence on municipal governments, which built and maintained the physical and legal prerequisites for trade.

Developments in Novgorod are less clear. Here, merchants struggled with their dependency on the *boyars*. They were selling the taxes of the *boyars* that had been collected in kind to Western traders while constantly striving for power and influence of their own. Both groups, however, were dependent on trade as the basis of their wealth. It is clear that the Novgorod merchants also developed institutions of trade in order to reduce their transaction costs. The extent and power of such institutions, however, is unclear.

Trade between the Western and the Eastern merchants was challenged by the cultural and religious differences between the two regions. Difficulties were to some extent mediated and secured by commercial and political treaties, institutions, and long standing customs, but during the entirety of its existence, the trade remained in a state of "*equum pro equo dare*", or barter trade (GOETZ 1922, 355), even if merchants in 1414 already asked the question whether it would be profitable or not: "*prophijtyk syn to dogende ofte nycht*" (HANSISCHES URKUNDENBUCH V, no. 1140, 592). In the trade between the West and East in Novgorod, some obstacles were overcome, but the differences remained. These differences made the trade challenging, interesting, and lucrative for the Hanseatic merchants.

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Coinless exchange and foreign merchants in medieval Iceland (AD 900-1600)

by NATASCHA MEHLER & MARK GARDINER

Iceland, Middle Ages, trade, exchange, harbour, credit

The nature and operation of medieval trade in Iceland over seven centuries is examined in this paper. Three phases of trade can be distinguished. The first, from c. 900 was marked by the growing dominance of Norwegian traders who came to dominate overseas commerce and culminated with the union with Norway. The second from c. 1250 is marked by the growing importance of dried cod (stockfish) which superseded coarse cloth (vaðmál) as the major export from Iceland. The third phase in the 15th and 16th centuries was marked by the capture of the stockfish trade by the English and German merchants. The modest level of trade prevented the emergence of a merchant class in Iceland, but the demand for vaðmál and stockfish had a profound effect on Icelandic society and in the measures of value used. Coins were not employed, and trade was carried out by barter. The units for the measurement of value were successively silver, cloth and then stockfish. As the items of trade changed, so did the units of value.

The rate of exchange (or value) of goods was set by the local or national assemblies. The harbours had little infrastructure and were marked only by protected anchorages and by booths for the merchants to occupy and store goods. Trade was a high-risk activity. The long, sometimes stormy voyage to Iceland and varying levels of violence in the country made it an uncertain venture.

Münzloser Austausch und fremde Händler im mittelalterlichen Island (900-1600 n. Chr.)

Island, Mittelalter, Handel, Tausch, Hafen, Kredit

Dieser Beitrag fasst zusammen, wie der mittelalterliche Handel in Island im Verlauf von etwa 700 Jahren ablief. Drei Phasen werden hierbei unterschieden: Die erste, ab etwa 900, ist von der zunehmenden Dominanz norwegischer Kaufleute charakterisiert, die den Fernhandel bestimmten. Dies führte letztendlich zur Union mit Norwegen. Die zweite Phase, ab etwa 1250, ist geprägt von der Bedeutungszunahme des Stockfisches, der groben Wollstoff (vaðmál) als wichtigstes isländisches Exportgut verdrängte. In der dritten Phase, ab dem 15. bzw. 16. Jahrhundert, liegt der Stockfisch-Handel ausschließlich in den Händen englischer und deutscher Kaufleute. Der bescheidene Binnenhandel verhinderte, dass in Island eine Kaufmannsschicht entstand, aber die Nachfrage nach vaðmál und Stockfisch hatte einen nachhaltigen Einfluss auf die isländische Gesellschaft und die verwendeten Maßsysteme. Münzen waren nicht in Verwendung und Handel beruhte auf Tausch. Die Maß- und Werteeinheiten waren anfänglich Silber, dann Textilien und später Stockfisch. Im Wechsel mit den Exportgütern änderten sich auch die Tauschwerte.

Die Wechselraten für die Tauschgüter wurden vom Thing bestimmt. Die Häfen bestanden aus geschützten Ankerplätzen und Buden für die Händler, um Waren zu lagern, verfügten aber ansonsten kaum über Infrastruktur. Handel war ein riskantes Unternehmen. Die lange und gelegentlich stürmische Reise nach Island sowie die Risiken von Gewalt auf der Insel machten die Überfahrt zu einem ungewissen Abenteuer.

Introduction

Iceland might appear to have been a marginal place far away and isolated from the (northern) European trading networks of the medieval period. Indeed, that might have been the case in the late 9th century, when people from western Norway (and other places) started to explore the uninhabited island and, over the course of the next decades, to colonise it. The Norse colonisers in Iceland initially created an independent country without a king (Commonwealth period, AD 930-1262), but subsequently Iceland became a *skattland* or 'tributary land' as part of the Norwegian realm. Settlers maintained close contact with their home areas and voyages across the rough North Atlantic were undertaken quite frequently to trade, to travel south to the Continent, for political reasons, by visiting chieftains, kings or – after the introduction of Christianity around 1000 AD – bishops, and to keep family bonds together (JÓHANNESSON 1974; SIGURÐSSON 2010, 62-65; SEMPLE *et al.* 2020, 181). Despite its remote location, Iceland was part of a trade network spanning not only northern Europe, but reaching far beyond (Fig. 1).

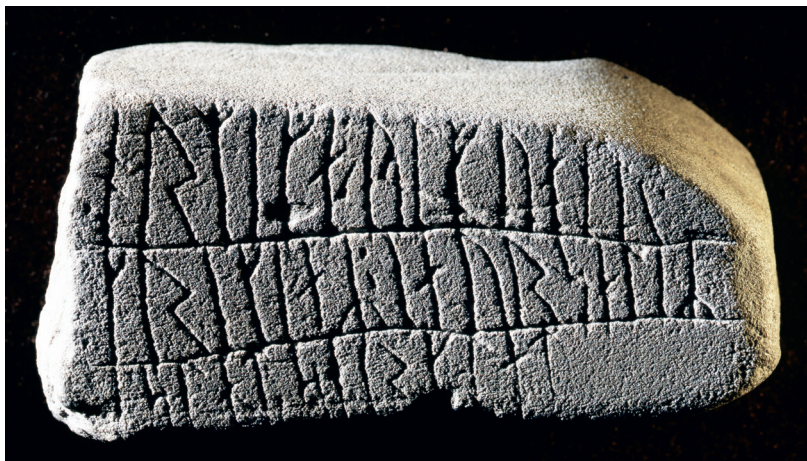
There was no distinct merchant class in Iceland during the Viking and medieval period, but written sources tell us that in the first centuries of the settlement chieftains were both involved themselves in overseas trade and acted as the regulators of trading activity. Each chieftain (ON *goði*) had several *þingmen*, who represented their chieftain at the local or general assembly (*þing*) (see below). These *þingmen* were sometimes also local traders (GELSINGER 1981, 31; BYOCK 2001, 118-122; SEMPLE *et al.* 2020, 234-235). It is reasonable to assume that such *þingmen* were amongst those local traders mentioned in written sources who acquired goods from the foreign merchants and then sold them on to those Icelanders who were not able to come to the trading sites to do business with the foreigners directly (EBEL 1977, 4; GARDINER/MEHLER 2007, 399, tab. 1). Chieftains had the power to prevent ships from trading, could provide lodging for foreign traders, often

inviting them to stay on their farms, and protected foreign traders against assaults (EBEL 1985, 114; JAKOBSSON 2007, 145). As a result, they had considerable influence on the nature of trade and the manner of its operation.

In the later phase of the Commonwealth period ship traffic had decreased and it is generally assumed that international contacts declined in the 13th century (BOULHOSA 2010, 184-190). After the end of the Commonwealth and under Norwegian control (after 1262) most of Iceland's trade was channelled through Bergen which, in effect, formed a staple port for the whole of the Norse world. There was hardly any direct contact beyond Norway and contact was mediated by Norwegian merchants who increasingly controlled access to goods and also to knowledge which had been picked up from foreign arrivals in Bergen. The scale of the trade may be indicated by the agreement made with Iceland through the two contracts that had brought about the union of Iceland and Norway. In the second of these, the so-called Old Covenant (Icel. *gamli sáttmáli*) of 1302, the king guaranteed to send six ships annually to Iceland (GELSINGER 1981, 43-44, 178-180; SIGURÐSSON 2014, 181-187).¹ Specifically, according to a document of 1320, two were to go to the south of the island, two to the north and one each to the West Fjords (Vestfirðir) and to the East Fjords (ÞORLÁKSSON 2010, 150).² How far this conformed to reality is questionable, but the agreement remained in force, at least in theory, for quite some time.³ A document from 1413 provides us with more detail about this arrangement: six ships were to sail from Norway to Iceland annually; the crews then stayed in Iceland for a year, while six other ships sailed back to Bergen, which means there were 12 ship movements each year (ÞORLÁKSSON 2010, 151) (Fig. 2). The Norwegian kings had a great interest in the foreign trade of Iceland, since they levied 5 % tax on all imports from Iceland, the so-called ON *sekkjagald* (ÞORLÁKSSON 2010, 155).

During the course of the 15th century the system of channelling trade through Bergen broke down and the volume of trade expanded considerably. With the arrival of English fishing vessels around 1412, contact increased again (GELSINGER 1981, 184-186; GARDINER/MEHLER 2007, 401). The waters around Iceland soon became one of the major fishing areas for boats from the east coast of England. In 1417-1418, 11 ships went from Scarborough alone. The businesses of fishing and trade were rarely separate activities for English merchants voyaging to Iceland, and the English ships grew so

▼ Fig. 1. Rune stone from Timans on the island of Gotland, Sweden, dated to the second half of the 11th century. The inscription reads "Ormika, Ulvair, Grekland, Island, Särkland". It indicates that Ormika and Ulvair had visited, or had contact with Greece, Iceland and Jerusalem (Rune stone G 216, c. 9 cm long) (kindly provided by Gotlands Museum, we would like to thank Chr. Kilger for this image and for his valubale input).



1 It has been argued that this clause has been a later addition of the 15th and 16th century (BOULHOSA 2005, 87-153; ÞORLÁKSSON 2010, 150-153).

2 DI 2, no. 343; for a summary of the discussion of this issue, see ÞORLÁKSSON 2010, 150.

3 See BOULHOSA 2010, 179-180 for the problems in attempting to estimate more precisely the size of trade.



rapidly that in 1414 the Danish king sent a letter to Iceland forbidding trade with foreigners, though this was largely ignored (GARDINER 2016, 81-82). The influence of the English was so great that the subsequent decades have been referred to in Icelandic historical writing as the “English Age” (PÓRSTEINSSON 1970). With the appearance of German merchants in Iceland in the later part of the 15th century gradually more ships began to sail to Iceland (GARDINER/MEHLER 2019). During the 16th century between 15 and 26 ships from Hamburg and Bremen per year were arriving in Iceland (HOFMEISTER 2000; HOLTERMAN 2020, 209).

The range of commodities brought to Iceland from both Germany and England included luxury items, such as wine, but also practical items including flour, wax, presumably for candles, salt, knives, caps and horseshoes, beer, items of clothing, raw materials, including iron, cloth and wood, and manufactured goods, including pots and knives. Exports consisted mostly of dried cod (stockfish), cloth, sulphur and, as luxury goods, gyrfalcons (see below). The trade with Hamburg and Bremen reached a high point in the 16th century by which time German merchants had managed to expel the English from trading in Iceland entirely, though they continued to fish in Icelandic waters. Voyages from northern Germany to Iceland were frequent during this century, with up to 25 ships a year undertaking the journey to Iceland. However, as Iceland was then part of the kingdom of Denmark-Norway, German trade was regulated by the Danish kings. In the early 17th century the authorities put an end

to the business, by introducing the Danish trade monopoly (ÞORLÁKSSON 2010; GARDINER/MEHLER 2019).

Our information regarding trade, exchange mechanisms and networks stems mostly from written sources. For the Commonwealth period (AD 930-1262), the Icelandic written legacy is rich, ranging from the detailed laws of *Grágás* to ‘The Book of Settlement’ (*Landnámabók*) and the sagas. The number of written sources also increases with the growth of external trade over time. But while abundant records have been kept by the German and English merchants, this was not equally true for their trading partners in Iceland and, of course, only a portion of the records compiled have actually survived. In particular, written sources to allow the measurement of the volume of trade do not always survive, though the English customs accounts of Bristol and Hull are particularly valuable in this respect (CHILDS 1995). Records which might have enabled us to understand the manner in which the commerce was transacted are particularly rare. The documents about the business of trade kept by civil authorities on Iceland are few in number and scant in detail. This disparity in perspective is an important factor to bear in mind when we consider trade which was a two-way process (GARDINER/MEHLER 2019, 11-12).

The consequence of the nature of the records which have survived is that while we can understand the nature of trade at a macro-economic level, it is much more difficult to obtain insights into its operation at the micro-economic scale. The business of exchange in goods in Iceland can

▲ Fig. 2. Aerial view of Gásir, a medieval coastal market site in the north of Iceland which was frequented by Norwegian merchants. The booth structures and the round enclosure for the merchant church are clearly visible (image by R. Wefßling, J. Coolen, © HaNoA project).

only be seen in outline and the nature of production for the market within the household and the consumption of goods obtained in return remains largely obscure.

Terminology

The available written sources that inform us about traders and trade mechanisms in medieval Iceland are in a range of languages: Old Norse (ON), Old Danish (OD) and Middle Low German (MLG). In the Old Norse Icelandic sources merchants are called *kaupmaðr* or *farmaðr*, the latter referring to seafarers that were involved in trade. Foreign merchants were also called *austmenn* (*i. e.* men from the East) which seems to have been used synonymously with Norse (JAKOBSSON 2007, 144). We also read about wandering salesmen (or possibly women, see below) named ON *mangari*. They sold goods they made themselves, had bought on farms, or which they had bought from foreign merchants at the trading sites (*e. g.* FALK 1912, 4; EBEL 1977, 4; GARDINER/MEHLER 2007). The seasonal fishermen who dwelled in cottages at the fishing stations and who sold the fish to the foreigners were called ON *búðarmenn* (*i. e.* booth-men) (ÞORLÁKSSON 2010, 156). The Bergen merchants that travelled to Iceland formed a group named ON *Íslandsfarar* (*i. e.* Iceland farers) (ÞORLÁKSSON 2010, 167).

In German records the merchants that travelled to Iceland were called *kopman* (MLG), with different spelling variations such as *kopmann*. Their servants were called *knechte* (MLG; *sgl. knecht*), and were responsible for helping the merchants with special tasks. We also read of apprentices, that is young men (MLG *jungens*, ON *smadreingier*) but it is often not clear whether these are ship's

boys (in that case referred to as MLG *putker*) or merchants' trainees. German merchants often conducted their business jointly in a trading company called *maschup*, deriving from Dutch *matschoppie*, *i. e.* association (see below). They shared their capital, the risk and the profit. Before that, merchants operated in *wedderleginge*, a similar organisation, but with a less clear definition about trading goals. The skipper (MLG *schipper*) of a ship had considerable power in the *maschup* and often was part-owner of a ship or possibly also traded himself (HOLTERMAN 2020, 339-343).

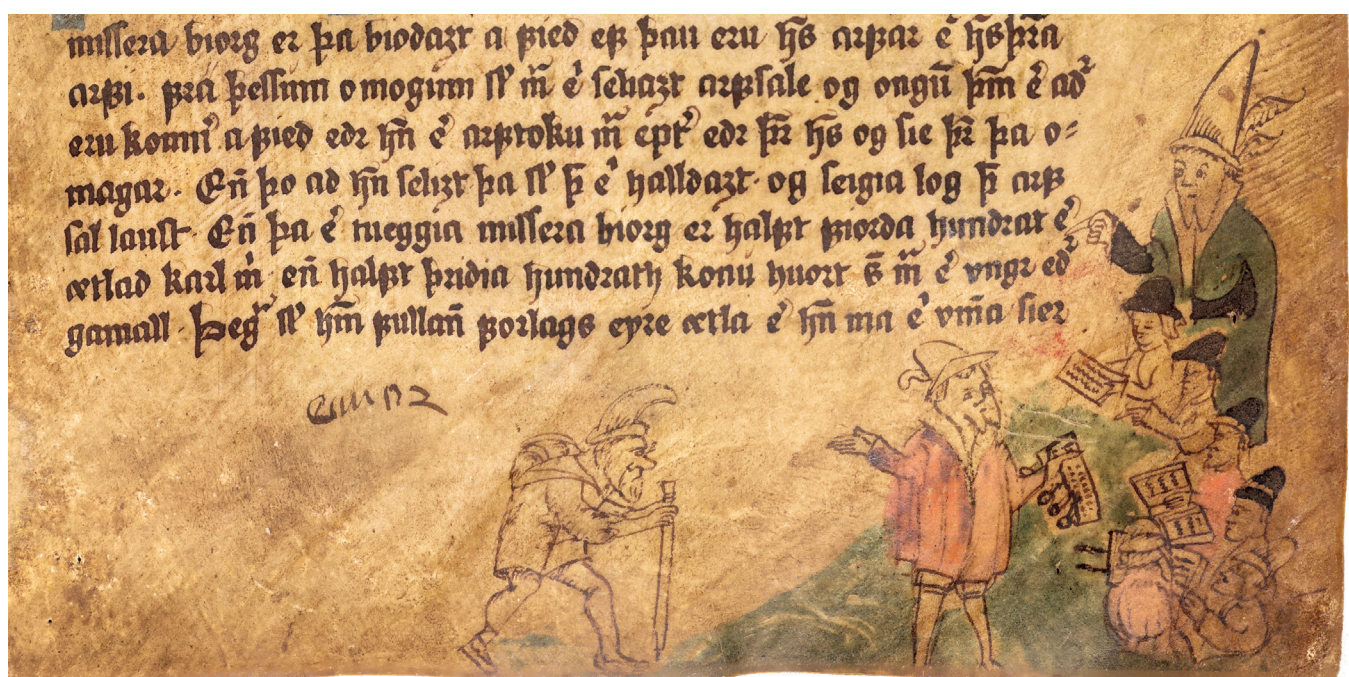
In England similar groups of merchants might come together to finance or participate in particular voyages, known as ventures. Some such partnerships, however, persisted for many years. The only formal organisations were guilds, generally founded at first for religious purposes, but which might over time become dominated by certain trades and exercise a regulatory function (KERMODE 1998, 30-31). Boys learning the art of sailing initially were taken on as ships' boys, but as they progressed they might be trained formally or informally as apprentices (BURWASH 1947, 69n; WARD 2009, 103).

Tools of exchange

Language and literacy

Several languages were in use between clients and merchants during the Viking and medieval periods: Icelandic and Latin (the latter practised only by the clergymen), Danish, especially after Iceland came under Danish rule (*c.* 1380), some English in the time of the English trade period (*c.* 15th century) and later Middle Low German (*c.* 16th century). From the late 15th century onwards, when trade was exclusively in the hands of

▼ Fig. 3. Illumination in *Jónsbók* showing a group of men with books and diplomas (16th century). *Reykjabók AM 345 fol., f. 27r, bottom margin* (image provided by The Árni Magnússon Institute of Icelandic studies, Reykjavík).



Germans, Middle Low German was the most important foreign language. Danish was then understood by most because Iceland was administered through Denmark after c. 1380. Communication does not seem to have been a problem during the day-to-day business, at least no written accounts ever mention it. Either merchants learnt Icelandic, or a pidgin developed which allowed communication. At the *alþing*, the Icelandic general assembly, it was proclaimed in 1533 that “boys [from merchant ships] who want to learn Icelandic” and want to get to know the land were allowed to stay for the winter.⁴ We should not imagine that all people had a full command of foreign languages. Communications between Basque whalers and Icelanders from the 17th century was facilitated by the use of a pidgin (or hybrid language) and it is possible that something similar may have been used in German-Iceland interchanges (HUALDE 1984; MIGLIO 2008).

Literacy was available only to a small group of people (Fig. 3). However, the development of the vernacular alphabet is already described in the mid-12th century in the so-called “First Grammatical Treatise” (Icel. *Fyrsta málfræðiritgerðin*), a work on phonology by an unknown Icelandic author (HAUGEN 1972, 5). Latin literacy came to Iceland together with Christianity, i. e. after c. 1000 AD and it was taught in the church schools of the two bishoprics at Skálholt and Hólar. Vernacular literacy increased considerably by the 14th century, but was still restricted to the elites (HERMANN 2017, 35-36).

Accounting and weights

The basic tools for trade were weighing scales of copper alloy with weights made of copper alloy or lead. A number of such items have been found

during archaeological excavations of pagan graves pre-dating c. 1000 AD (ELDJÁRN 2000, 411-415). The weights today vary considerably in weight and no analysis has yet been undertaken to put the archaeological finds in context with the weight units known from written sources. A common weight was the ON *mörk* (pl. *merkur*), the weight of a mark (c. 220-250 g) one of which was excavated (HALLMUNDSDÓTTIR/JUEL HANSEN 2012, 10, 14).

The subdivision of the *mörk* was the ounce called ON *eyrir* (pl. *aurar*) (c. 28 g), the equivalent to one ounce of silver. One *mörk* consisted of eight *aurar*. A *mörk* could also be divided into *örtugar* and *penningar*. Other units were the ON *fjörðung* (pl. *fjörðungar*), corresponding to c. 4.34 kg, and the ON *vett* (c. 34.7 kg). One *vett* (load) was divided into eight units of 10 lb (c. 4.4 kg). In addition to these units were the pound units: the smallest of these units was the ON *skálapund* (scale pound) weighing approx. 434 g. Then comes the ON *lifspund* (c. 5.22 kg), the ON *skippund* (ship's pound, c. 125 kg) and finally the ON *lest* (last, c. 1.5 metric tons) (EBEL 1977, 11; GELSINGER 1981, 33-34, 251, 253; ÞORSTEINSSON/GRÍMSDÓTTIR 1989, 134-140).

Cloth, a widely exported commodity in the medieval period, was weighed with the basic units mentioned above or measured in length using wooden sticks with the length of an ell which was either called *alin* (pl. *álnir*), or *stikkur*, the latter referring to a wooden measure the length of an ell (Fig. 4). The ell was about 49.2 cm and in the later medieval period got slightly longer (c. 54-57 cm) (EBEL 1977, 11; DENNIS *et al.* 1980, 244). The use of standardised measures for cloth is discussed further below.

4 DI 16, no. 333.



◀ Fig. 4. The control of lengths of measurements is depicted in a 15th-century version of *Jónsbók* (Heynesbók) (AM 147 4to). The images are labelled with “rett er stikan” (the ell measure is flawless), “rangur pundari” (faulty scales) and “þetta er skóla” (that is a barrel) (image provided by The Árni Magnússon Institute of Icelandic studies, Reykjavík).

Since literacy was limited to the elite strata of society and no merchant class existed, accounting was not much in use, at least before c. 1500. The bishops of the two dioceses in Hólar and Skálholt frequently ordered goods to be brought to Iceland by foreign merchants and some records are handed down which account for such business. Bishop Gissur Einarsson, for example, provides us with a vernacular account (Icel. *reikningsskapr*) dated 1542 of his business with English merchants who had a base at the Westman Islands (Vestmannaeyjar). Such an account is always only a list of goods without any indication of price.⁵ However, the German traders that came to Iceland produced detailed accounts of their business, as was done on the Continent at the time (STOCKHUSEN 2015). Two account books of German traders trading in Iceland in the 16th century have survived and they provide valuable information about the goods they brought and exchanged, as well as the system of pricing operated (KOHL 1905; HOFMEISTER 2001).

Transport in bulk

The bulk cargoes that came to Iceland from both Germany and England were mainly flour or cereals, beer and timber. Other items, such as horseshoes, clothes or ceramic vessels came in smaller quantities (HOFMEISTER 2001). Some goods were wrapped in cloth (ON *pakkavaðmál*), fragments of which were found during archaeological excavations (MÖLLER-WIERING 2002, 167). Unwieldy commodities, such as dried cod or bars of schist were tied up with thread or yarn, as was found among the cargo of the Darss shipwreck which sank off the north-eastern coast of Germany in the 14th century. That cargo consisted of goods from Iceland (sulphur, packed in a barrel) and Norway (dried cod, reindeer antler) (MÖLLER-WIERING 2002, 168; MEHLER 2009; 2015, 101). Foreign traders also used barrels to transport and store goods. Barrels, generally made of oak, followed standard measuring units and often show owners marks incised on lids or staves. They formed a convenient way of handling goods and provided water-tight containers. The weight unit ON *áhöfn* means “cargo of a ship”, and corresponded to 12 lasts, or 18 metric tons (GELSINGER 1981, 34). On German ships that came to Iceland, a cooper generally formed part of the ship’s crew (KOHL 1905; HOLTERMAN in press). Their role was to make up barrels from loose staves or seal up full barrels. Those barrels that remained in Iceland were often reused by the locals and transformed into everyday items, such as buckets or drinking vessels (MEHLER 2007, 232-233).

Commodities

It would have been possible for the early Icelanders to survive in the country without any trade with the external world. Icelanders produced the

most important foodstuffs, such as meat, fish, dairy products and even some vegetables, as well as iron tools in their own homesteads. During the first centuries of the settlement barley was grown but, as the climate deteriorated after the medieval warm period, this became less practical. Soon the demand for cereals had to be met by foreign imports. Vigorous trading activity with Norway, England and the Continent opened the route for goods which improved the standard of living (KARLSSON 2000, 48; MEHLER 2007, 227; TRIGG *et al.* 2009). A variety of commodities came on board the foreign ships. The bulk goods have been noted above. Other goods coming in smaller quantities included linen, clothes, wax, tar, honey, spices, wine, salt, cutlery, horseshoes, tools and liturgical items for the clergymen (THORSTEINSSON 1972, 190; GELSINGER 1981, 14-16; ÞORSTEINSSON/GRÍMSDÓTTIR 1989, 131). Exports were largely of just three commodities. The first was woollen cloth (Icel. *vaðmál*) which was of major importance throughout the Viking and medieval period. Dried fish, mainly cod (‘stockfish’), rose in importance in the 13th century (BARRETT *et al.* 2004; GARDINER 2016; VÉSTEINSSON 2016). Both commodities were intensively traded with England and later northern Germany. Sulphur became a commodity that was widely exported in bulk, especially from the later medieval period onwards (MEHLER 2015). A less important export was train oil produced from fish and sea mammals. Luxurious goods that were exported included arctic fox pelt, seal skins and live gyrfalcons (GELSINGER 1981, 12-14; ÞORSTEINSSON/GRÍMSDÓTTIR 1989, 135; MEHLER *et al.* 2018).

Currencies

Icelandic society did not operate with coins during the Viking and medieval periods. Only a couple of coins have to date been found during archaeological excavations (HOLT 1998).⁶ Foreign coins from Norway or England were used only to pay fines or debts, acquire land or as compensation or dowries (GULLBEKK 2011, 184-186; EKENGREN/DOMEJI LUNDBORG 2015). Trade was conducted almost exclusively by barter and people either paid in kind or established credit. Despite the use of a commodity money system, silver was the main standard of value in Iceland until the 12th century against which the values of other items were calculated (GELSINGER 1981, 34; GULLBEKK 2011, 186). Hacksilver has been found in several archaeological contexts; the most famous are the hacksilver hoard finds from Sandmúli (c. 304 g) and Miðhús (c. 653 g) (ELDJÁRN 2000, 423-426) (see below). The many weights found in pre-Christian graves in Iceland, a large number of them ranging between 4 g and 25 g, bear witness to the use of hacksilver (ELDJÁRN 2000, 413-415).

5 DI 11, no. 130. I am grateful to Árni Dániel Júlíússon for this.

6 The coin hoard from Gaulverjabær (see Storage and banking, below) is an exception.

Grágás contains the oldest surviving price lists of goods and the value of items. One new iron cauldron of about 16 kg, for example, was defined as worth 60 ON *lögaurar*, six sheep skins were worth one *lögeyrir*. A *lögeyrir* was a legitimate instrument of payment. It was not a coin but the weight of an ounce of silver (ON *eyrir*) which corresponded to the value of 6 ells of *vaðmál*, but that value varied slightly over time.

The main abstract unit of value was ON *kúgildi* which was equivalent to the value of a milking cow. Legal texts, such as *Grágás* and *Jónsbók* mention equivalent values for *kúgildi* in other livestock (*i. e.* six ewes) or also for land rent values in units of *kúgildi*. For example, *Grágás* mentions the value of a *kúgildi* to be about 20 *aurar*. In addition, one *kúgildi* was worth 120 ells of *vaðmál*. However, equivalent values could vary over time and in different regions (EINZIG 1966, 261; MCCOOEY 2017, 77-80, 83-85, tab. 1).

Another important unit of exchange was cloth (ON *vaðmál*, from *váð* = cloth and *mál* = a measure, or unit) which was used to pay tithes and taxes, fines, and trade goods (ÞORLÁKSSON 1991). Exchange value for cloth was settled at the Icelandic assemblies and written down in medieval law codes, such as *Grágás*, *Járnsiða* and *Jónsbók*. The cloth currency was based on legally negotiated exchange rates for the value of goods relative to other products (EBEL 1985, 117-118; KILGER 2008, 296-297; HAYEUR SMITH 2019, 251). To serve as currency, cloth needed to be woven in particular lengths and widths which were evaluated by regional authorities (HAYEUR SMITH 2013, 731). It was a woollen 2/2 twill, measured by the number of threads per ell in its warp and weft. Both the value and standard measurements for cloth varied over time. In the 12th and 13th century, a standard *vaðmál* was 2 ells in width (1 legal ell = 49.2 cm) and 6 ells in length. This formed the unit named ON *eyrir* (pl. *aurar*), the equivalent to one ounce of silver, which became the basic measurement unit for exchange (ÞORLÁKSSON 1991; KILGER 2008, 296-297; HAYEUR SMITH 2019, 268). Imported silver – in the form of hacksilver – was equally important as cloth up to the 12th century and was the value against which other items were calculated. After *c.* 1300, the cloth unit of currency starts to be replaced by one based on dried fish, although cloth currency existed until the 16th century. From at least the 15th century onwards dried fish became the most important medium of exchange due to the increase in fish exports. For example, 48 ells of *vaðmál* corresponded to 120 dried fish (EINZIG 1966, 262). In 16th-century German account books of merchants that traded in Iceland, *vaðmál* was still mentioned as payment but fish was more important. Here, one standard fish weighed *c.* 2 lb. One barrel of butter was worth 120 fish, one barrel of flour was worth 30 fish (HOFMEISTER 2001; HOLTERMAN 2020, 59 tab. 2.2.).

These changes reflect a fundamental shift in the meaning of capital in Icelandic society. Initially, wealth might be assessed in terms of cattle which were a means of producing milk products and as a source of meat. However, as the Icelandic economy became more dependent on trade, the units of value altered, first to cloth which could be exported to Norway and then to dried fish which was traded with Bergen, and later English and German merchants. Capital – that is accumulated wealth – came to exist primarily in its potential for trade and hence to obtain traded products. Trade shifted Icelandic society from one which was based around personal prestige or status, to one which valued the possession of goods.

Social and political organisation of trade

Organisation and scale

The absence of a monetary system meant that foreign merchants had to adapt to the Icelandic commodity money system. Attempts to regulate trade closely was a feature of Icelandic commerce where prices could not be determined by supply and demand, but had to reflect a reasonable value to the suppliers and purchasers. Unregulated commerce in the absence of a true market was hardly practical or, for Icelanders, desirable. Regulation included not only fixing prices but also, from the Hanse period onwards, licensing merchants to trade and even defining the ports where they might operate (MEHLER/GARDINER 2013, 3; HOLTERMAN 2020, 107-116).

Trade was controlled and regulated during the Viking Age by the chieftains (ON *goðar*). As the leaders of the *þing*, the political assemblies (see below), they brought about agreements on equivalents of goods and controlled payments by setting the prices for the trade between Icelanders and foreigners. Once a foreign ship arrived, the chieftain who lived nearest to the landing place where the ship anchored went there to put maximum prices on the goods, a process referred to as ON *kaupsetning* (ÞORLÁKSSON 1978, 113). This *kaupsetning* was done through ON *forráðsmen*, three elected inspectors per district, who were probably appointed by chieftains on behalf of the *þing* institution. Violations of the price of exchange value of goods were heard in hearings either in the home of the prosecutor or at the local assembly site (see below) (SEMPLE *et al.* 2020, 234). The control of foreign trade was a major source of the chieftain's wealth (ÞORLÁKSSON 1978, 112; MILLER 1986, 38).

During the later medieval period the operation of foreign trade in Iceland changed considerably. The concentration of power in the hands of chieftains was substantially reduced after 1220, when they started to lose their monopoly to determine the prices of goods to the merchants. It has been argued that this change was brought about by the

foreign merchants who had been unhappy with the system and gradually were able to expand their power and influence (ÞORLÁKSSON 1978, 113; KARLSSON 2000, 51). After Iceland had become part of the Norwegian realm in 1262, it was drawn further into the northern European markets and trade could no longer operate on Icelandic terms only (SEMPLE *et al.* 2020, 236-237). Legislation was now necessary that was valid for all parts of Norway, including Iceland. The legal reforms of the Norwegian kings, Magnus the Lawmender and Eric Magnusson, in the second half of the 13th century had consequences also for Iceland, where two royal laws were introduced. *Jarnsida* (1271) and *Jónsbók* (1281) were both based on Norwegian laws. The adoption of these two laws implied the introduction of the Norwegian administrative and legal system in Iceland (SIGURÐSSON 2010, 64; FRANKOT 2012, 10). However, even as the scale of foreign trade grew, foreign merchants continued to be subject to Icelandic law and regulation (see below).

Social positions

Trade with foreign merchants was initially restricted to the people of higher social ranks: chieftains and, with the strengthening of Christianity and the church institution, also to bishops. During the Commonwealth period, when overseas trade was mostly in the hands of Norwegian merchants and Icelandic chieftains, the chieftains that were involved in the trade with Norway and those that travelled there are described as “men of honour” (ON *virðingamenn*) (EBEL 1977, 18). As mentioned above, chieftains also regulated trade and lodged foreign merchants over winter for which some wealth was necessary. We can see some of this wealth and status reflected in the archaeological record. Some pagan graves from the period before c. 1000 AD contain metal weights (copper alloy and lead) (Fig. 5) and weighing scales, and the quality and amount of grave goods indicates that the deceased was a person of high social rank. Those

graves that contain weights may indicate that the deceased person was also involved in trading activities which accounted for his social status.

In the later medieval period, written sources report that bishops were involved in trade. Initially, Icelandic bishops held close trading connections with the archbishop in Norway who received much of the tax paid in kind which he needed to sell and for which he operated harbour infrastructure and ships (ÍSLEIFSDÓTTIR-BICKEL 1996, 46). The two bishoprics at Hólar and Skálholt, economic and cultural centres, operated a fishing fleet and fitted out ships that sailed to Norway. A storehouse in the harbour of Eyrbakkí in the south of Iceland belonged to the bishop of Skálholt. When bishops of English origin were installed in the two bishoprics in the first half of the 15th century, they used their position to develop trade with their home country.⁷ In the 16th century the Icelandic bishops were connected with German merchants both in Iceland and in Hamburg in manifold ways (HOLTERMAN 2020, *e. g.* 175-177).

Domestic commerce within Iceland was in the hands of two groups of people: as mentioned above, wandering salespeople (ON *mangari*) who went from farm to farm to sell goods, and intermediate traders who made their living by buying goods from the foreign merchants at the coastal trading sites and then sold these to their clients who could not make the journey to the trading sites. It was possible to acquire some wealth with this, as Hænsa-Þóris saga reports. It tells of Þórir who made his living by selling goods between districts. Another example is that of Oddr, reported in Bandamanna saga, who started his business by owning parts of a ferry, but soon had his own by which he transported timber and fish on Miðfjörður in the north of Iceland. He bought foreign goods in the coastal trading stations and sold them on in the interior of Iceland. He became wealthy enough to buy two ocean-going ships and continued his business in overseas trade (EBEL 1977, 4-5). However, most *mangari* did not make such wealth and remained in the lower stratum of society. Moreover, it seems that *mangari* were not respected people and the word even became used as an abusive term (EBEL 1977, 8).

Infrastructure of mobility: Prerequisites and physical evidence

Mobility

The geographical position of Iceland meant that the island depended on ship traffic. Foreign trade and contact with the outside world occurred in various ports along the coast. Icelanders needed to travel to and along the extensive coastline of the island to find the merchants. This was done by horse or foot, or people went along the coast in boats. Horses and boats were valued by Icelanders, as

▼ Fig. 5. Lead weights from Viking graves in Dalvík (PMJS No. 1909-194-24). The length of the cylindrical weight in the centre is 1.4 cm (image by Í. Brynjólfsson, Þjóðminjasafn Íslands).



⁷ DI 4, no. 518.

mobility was essential. The value of these and their meaning for Icelanders is indicated by their funerary customs of pre-Christian times. A number of pagan graves include bodies placed in a boat, or together with their horse (ELDJÁRN 2000). Around 150 horse graves are known, with at least 175 individual horses, and a recent ancient DNA study has shown that the majority of these buried horses were male in their prime years (5 to 15 years of age) (LEIFSSON 2018, 228; NISTELBERGER *et al.* 2019). The boat burials are far less frequent as the vessels were certainly more valuable. About 10 of those are known, but none with preserved timbers, although their shape is marked by a series of boat nails. The length of the boats is mostly between 6 and 7 m which implies a four-oared boat, though smaller ones are known (ROBERTS/HREIÐARS-DÓTTIR 2013, 120; JÓNASSON 2018, fig. 13) (see below).

Geography and exploration

According to written sources, Irish hermits or monks were amongst the first explorers of Iceland. We do not know when this happened, but according to the Book of Icelanders (*Íslendingabók*, from the early 12th century) the Norwegians that settled Iceland in the late 9th century encountered some Irish Christians whom they called *papar* (*i. e.* priests). The ON term *papi* (pl. *papar*) is a borrowing from Irish *pápa*. We also do not know how long they remained in Iceland and whether there were ever a substantial number of Irish settlers. The colonisation of Iceland by settlers from Norway that started in the last decades of the 9th century is far better known (*e. g.* JÓHANNESSON 1974, 5-8; SMITH 1995). A reliable account of the exploration and colonisation of Iceland by settlers from Norway is preserved in *Landnámabók* (the Book of Settlements) which was probably compiled in the 12th century. It describes how Iceland was found and lists the names of 3000 people and a great number of settlements (JÓHANNESSON 1974, 9). As most of Iceland's terrain consists of mountains and lava deserts, settlements were only possible in the coastal plains and valleys and even today most of the settlements are found in the north and southwest.

Foreign travellers and cartographers were aware of the particular geography of Iceland, but lacked detailed knowledge. We are best informed about this only from the 16th century onwards. Travel accounts of two Germans are handed down, one named "Van Ysslande" by Goriet Peerse from Hamburg (1561), and Dithmar Blefken's account "Islandia" which reports his experience in Iceland in the years 1563 and 1565 (SEELMANN 1883; HOLZER/WALLISCH 2012). Both are typical travel reports of their time containing many exaggerations. Peerse describes the geography of the country and is clearly amazed by its particularities, such as volcanoes, fissures and swamps.

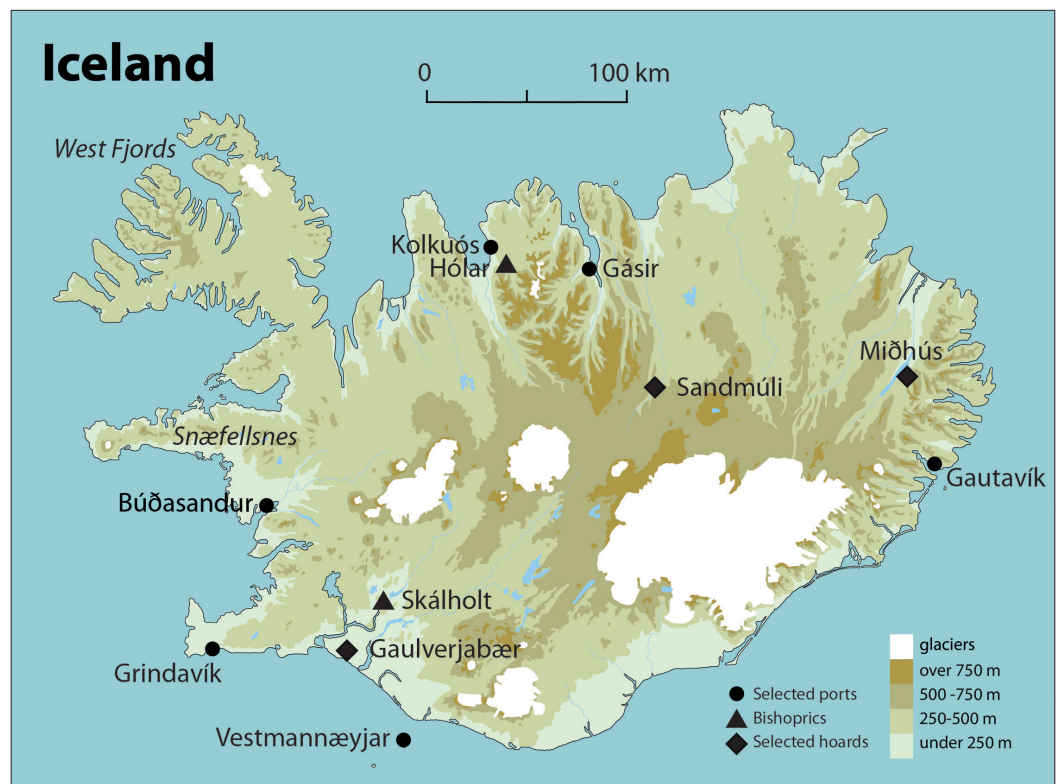
Physical evidence of an infrastructure of trade

The seafaring skills of navigation and pilotage, advanced boat construction with heavy cargo capacity, and landing places that connected land and sea were crucial for the colonisation of Iceland and the development of extensive networks of trade and exchange. Most ports in Iceland were simple landing places or natural harbours, consisting of a sandy or gravelly beach where boats were pulled ashore, or a natural jetty, to allow vessels of a deeper draught to be moored and unloaded. These harbours formed the economic, political and social interface between Iceland and northern Europe and, although seemingly insignificant, trade of considerable value and great importance was channelled through them, giving them a special role in the economic history of northern Europe. The harbours are characterised by a very limited infrastructure which meant that they could be established and abandoned according to environmental or commercial conditions. In those cases where jetties did exist, they were probably made of wood – either from imported wood or driftwood – but the archaeological evidence is lacking. Often, natural features, such as horizontal stone banks of cliffs were used as natural landing bridges and ships unloaded there. In many cases the harbours subsequently fell out of use, and the settlements were abandoned, so the archaeological remains are yet to be identified, even if they are known from historical records. The lack of physical evidence of Norse or medieval harbours results from a variety of factors (MEHLER *et al.* 2015, 313-315).

The number of sites along the extensive coast of Iceland which offer protection for ships against the storms of the North Atlantic is limited. The sandy coast on the south of the country provides few sheltered bays suitable for mooring or anchoring. The best harbours in Iceland are found within sheltered fjords, in estuaries and particularly in small bays behind natural spits. The suitability of the anchorage was not, of course, the only consideration. The ports had to be located in places frequented by merchants who were willing to exchange Icelandic produce for goods brought from abroad (GARDINER/MEHLER 2007, 395-396).

From written sources and archaeological surveys and excavations a considerable number of *coastal market sites* are known today but not all were used at the same time or were of equal importance (Fig. 6). Most sites were grouped in the southwest of Iceland (Reykjanes peninsula and south of it), around Snæfellsnes in the west, some in Vestfirðir (Western Fjords) and in the fjords of the north. As noted above, the south of Iceland was practically unsuitable due to the large sandy beaches and volcanic activity, and very few sites are to be found in the east of Iceland. Archaeological investigations have been conducted at Gásir and Kolkuós in the north, Búðasandur in the south-west and at Gautavík in the east (GARDINER/MEHLER 2007;

► Fig. 6. Map of Iceland with places mentioned in the text (map by M. Gardiner and L. Mulqueeny).



TRAUSTADÓTTIR *et al.* 2011; HARRISON 2014). All sites, all of which are mentioned in written sources, are characterised by the typical arrangement of small units of turf structures called ON *búðir* (sgl. *búð*) (*i. e.* booths). These are temporary dwellings where the traders stayed during the summer, or were used to store goods or equipment. As a rule, they consist of turf walls, sometimes faced and bolstered with stones, and the roof consisted of a wooden frame covered with woollen cloth (ON *vaðmál*). Such booths were also found at assembly or *þing* sites and often, sites served both purposes (VÉSTEINSSON 2013; SEMPLE *et al.* 2020, 239).

An example of a medieval coastal trading site is Búðasandur in the south-west of Iceland which is also known as Maríuhöfn. The site lies on the landward side of a storm beach to the west of the mountain of Reynivallaháls on Hvalfjörður. The inlet behind the beach is now very shallow, but it may have been deep enough during the Middle Ages to allow it to be used for boats. The booths occupy a long strip which run parallel to the inlet, with a few buildings on the north side cut into the spur of land lying to the north-west (Fig. 7). Small-scale archaeological excavations in one of the booths revealed material with a calibrated radiocarbon date of AD 1245 and 1375 at one sigma. It was also evident that the buildings were buried beneath a tephra layer dating to about 1490. A boat shelter may have been amongst the recorded ruins and the site fell out of use probably in the 15th century (ÞORKELSSON 2004; GARDINER/MEHLER 2007, 413–415). Excavations at Kolkuós, Gásir and Gautavík revealed similar clusters of turf

booths (but varying in extent and sizes) and none of the sites revealed physical evidence of harbour infrastructure, such as jetties. This may be due to the changing coastline, the erosion and the silting of many estuaries and fjords but it also needs to be noted that hardly any underwater surveys have taken place that could have revealed lost harbour infrastructure (GRASSEL/EDVARDSSON *in press*).

A rather different sort of site has been suggested by fieldwork. Ólafur Olavius writing in the 1770s recorded that Germans had their base on the Vestfirðir peninsula at a place called Svínanes and traded there. One of the turf-walled buildings on the farm was still known as the “German building” at the time the site was abandoned in the 1950s. Unlike the sites already mentioned which had a series of booths, this appears to have been a single structure. The trading site can never have been large and appears to have escaped any contemporary record. At best it was a minor place to which fishermen on the north side of Breiðafjörður brought dried fish to trade (GARDINER *et al.* 2011). This can be compared with the longer-lived and well documented 16th-century German trading site at Kumbaravogur on Snæfellsnes. That too seems to have had only one or possibly two buildings, suggesting that the infrastructure on some of the trading sites was very modest (GARDINER/MEHLER 2007, 415–418).

During the initial years of the settlement some Icelandic chieftains owned *ships* but this gradually changed as the vessels got older and could not be repaired due to the lack of suitable timber and know-how on the island. By 1262 it was mainly ships from



▲ Fig. 7. Plan drawing, digital terrain model and results of a geophysical survey of the ruins of the medieval coastal market site Búðasandur in the south-west of Iceland (image by J. Coolen and R. Weßling © HaNoA project).

Norway that arrived in Iceland (GUÐMUNDSSON 1997; KARLSSON 2000, 51). No shipwreck of the medieval period is known from Iceland and we do not have much knowledge about the ship construction (GRASSEL/EDVARDSSON in press), but archaeological finds from Scandinavia give us an idea about the size of the ships in use. The so called “Big Ship” of Bergen, a clinker construction excavated at Bryggen and dendrochronologically dated to the end of the 12th century, was approximately 27 to 30 m long and held a cargo capacity of about 60 *last* (i. e. 120 t) (CHRISTENSEN 2002; WICKLER 2016). The Bergen merchants that traded with Iceland enjoyed privileges granted by the Norwegian kings and were called ON *dróttseti*. They were in the possession of vessels. The king did not own ships and thus he depended on the tax of the merchants who owned ships. In the second half of the 14th century, however, the kings owned a fourth-part of each Iceland vessel and these parts could be rented out (ÞORLÁKSSON 2010, 167-168).

The first ship type we hear of in written sources is the knarr (ON *knorr*, pl. *knerrir*), used for sailing and rowing, and it appears to have been the main ship type from the settlement period until the latter half of the 14th century (KUHN 1972, 499-503). Alongside this, the most common term is ON *skip* (i. e. ship) or ON *bátr* (i. e. boat), without really differentiating between those two (FALK 1912, 86, 90; KUHN 1972, 502). These could also be more specifically identified by the number of oars the boat had. The smallest was the ON *fenerðr bátr* (two oar pairs, or four oars), then followed the *sexeringr* (six oars), *átteringr* (eight oars), *teineringr* (ten oars) and the *tolferingr* (twelve oars) (FALK 1912, 90-91). The term ON *bússur* (i. e. bus), that appears in sources from the 12th century onwards, may not refer to a different ship type but rather to a variant of the knarr (FALK 1912, 86, 90; KUHN 1972, 502). Busses are also the ones that are mentioned in the Old Covenant described above, in which the ship traffic between Norway and Iceland was regulated (ÞORLÁKSSON 2010, 152).

In the later medieval period the number of merchant ships from Germany, England or the Netherlands grew, as described above. Clinker-built ships remained the standard form and now we read of types, such as cogs and hulks. However, beyond their clinker construction, we have hardly any knowledge about what technical parameters constituted a certain ship type. In several instances, two or more sources that refer to one particular ship describe it differently, that is as a *cog*, a *holk* or a *carvel* (BELASUS 2019, 176).

Written sources often report that ships got lost on their way to Iceland, due to storms and drift ice, and because Iceland offered only a few safe anchorages. One reference from 1311 records 60 ships, specified as cogs and busses, beached on the shores of Iceland during a seven-day storm: “...almost 60 large ships, cogs (*kuggar*) and busses (*bússur*), foundered during the period of seven nights; the weather was so terrifying, that, even though the cables held, the ships foundered at their cables, no man knew how many people perished there”.

Larger vessels were used in the 15th and 16th centuries and these provided accommodation for the crew while anchored in Iceland. However, the size of the ships of Hamburg and Bremen sailing to Iceland at the end of the medieval period was limited by the conditions of the rivers Elbe and Weser. Due to moving sands and silting processes, ships could not exceed a 100 *last*-cargo capacity if they had to sail all the way up the rivers to Hamburg and Bremen. This is confirmed in written sources where the largest ship mentioned for the Iceland trade is stated to have been 90 *last* (BELASUS in press).

Storage and banking

Goods were stored in the trading stations, and probably also ships’ equipment in the period before 1400. Merchants generally arrive one year and overwintered in Iceland, returning to Norway the following spring. The excavations of the coastal market place at Gásir revealed a number of booth structures, some of which also served the purpose of storing

► Fig. 8. The Viking hacksilver hoard found at undir Sandmúla (image by Í. Brynjólfsson, Þjóðminjasafn Íslands). Scale 1:2.



goods. Two goods can be traced archaeologically. First, archaeoentomological analysis revealed a few samples of the granary weevil (*Sitophilus granarius*), a pest that comes with imported grain and that cannot reproduce in Iceland due to climatic conditions and so must have come on board the trading ships to Iceland. The discovery of the pest at Gásir indicates that grain was stored here (KONRÁÐSDÓTTIR 2010). Second, sulphur, an important export commodity from the later medieval period onwards, was stored here, as lumps of sulphur found in several excavated layers confirm (MEHLER 2015, 200).

Since skippers and crews were sometimes also lodged by chieftains, some of their goods and equipment was also stored at outhouses of the respective farms.

The seasonal pattern of trade changed in the 15th century with the arrival first of the English and then German ships which appeared in the late spring and departed before the onset of autumn. It

is doubtful whether they left any stock or equipment behind over the winter months. During the summer trading season, stock was brought from the ships anchored off-shore and exchanged with Icelandic clients. The Icelandic goods obtained in return were transferred to the hold of the ships which provided a secure and spacious storage place. They were, in effect, floating warehouses.

There was, of course, little need for banking, because coins were rarely used as a medium of exchange. However, silver hoards are known from the Viking period which mainly consist of hacksilver. There is, for example, the hacksilver hoard from the high-status farm named undir Sandmúla in the highlands (the so called Sandmúli hoard) which consists of 36 silver objects with a weight of 304 g and which date to the later decades of the 10th century (ELDJÁRN 2000, 373-375; GRAHAM-CAMPBELL 2005; VÉSTEINSSON *et al.* 2014) (Fig. 8). The famous hoard from Gaulverjabær is an example



of an Icelandic find that consists mostly of coins or coin fragments, 356 in total (495 g). Of these, 172 are Anglo-Saxon coins minted in England, with an end date of *c.* 1002/03, 160 in northern Germany, with an end date to *c.* 1010. The rest stems from Scandinavia and Ireland, and four Kufic coins underline the far-reaching contacts of the hoard's owner (ELDJÄRN 2000, 425; HOLT 2003). The reasons for their depositions remain obscure. As mentioned above, foreign coins were used to pay for land, or in connection with customary law, but not used for merchandise (GULLBEKK 2011, 184-186; EKENGREN/DOMEJI LUNDBORG 2015).

Security, risk and the legal system

Security

The Icelandic sagas, like any good story, give a dramatic and presumably unrealistic view of everyday life. According to the sagas, merchants were frequently killed, either due to blood vengeance or as part of their trading business. Valla-Ljóts saga reports of Boðvarr, a merchant, who has been killed in an act of blood vengeance (BYOCK 1982, 267). Ljósvefninga saga tells of a Norwegian merchant named Sigurðr who sold his goods to Solmundr. However, Solmundr refused the payment and subsequently Sigurðr was killed by Solmundr's brother (BYOCK 1982, 233). How often trading ventures ended in violence is impossible to determine from these accounts, but they must reflect the risk that a misunderstanding or sharp practice might lead to the use of force. It has been suggested that during the Commonwealth period foreign merchants were usually in possession of weapons, which implies that there was a lack of a sense of security (JAKOBSSON 2007, 146). To provide a safe ground for the act of trading, "market

peace" (ON *kaupgríð*) was established, a common practice during the Viking period and Middle Ages throughout northern Europe to protect both clients and traders. This may have been done in Iceland too. The term ON *gríð* denoted an agreed peaceful relationship between merchants and purchasers (SEMPLE *et al.* 2020, 234).

The security of trade did not necessarily improve after Iceland put itself under Norwegian control. The Norwegian and later Danish crowns lacked any effective means of enforcing their authority in Iceland or keeping the peace. Quarrels and disputes, also those relating to foreign trade, were brought to the assemblies (see below). The Icelandic officials made judgement and then reported to the Norwegian and later Danish king. This may have served for minor matters, but when the English merchants decided to flout Norwegian authority, as they did in the 15th century, it was difficult for the governors to enforce their authority. In the early 16th century, the nature of the struggle over power in Iceland changed character. The Danish authorities looked to the German merchants for their assistance with the unruly English, and that led to increasingly violent disputes between the two groups of traders in Iceland. Without any effective state authority, merchants had to look to their own security. German and English traders who came to Iceland very often had a gunner on board their ships (HOLTERMAN *in press*) and from the 15th century onwards many ships were equipped with firearms (Fig. 9). As the struggle between German and English sailors intensified, the latter are said to have constructed a fortification in 1532 at Grindavík. It was subsequently stormed by German merchants who are said to have killed many of the defenders (ÞORSTEINSSON 1957-1961, 80-82). Similarly, the Scots were used by the Danish authorities against the English merchants who were established in the

▲ Fig. 9. Detail of *Carta Marina* from 1539 showing armed ships from Hamburg, Scotland, Bremen and Lübeck off the southern coast of Iceland (Wikipedia Commons).

Westman Isles (Vestmannaeyjar) in 1565.⁸ Lead bullets excavated in the floor and walls of a booth at the coastal market place at Gautavík in the east of Iceland bear clear witness of violence at a trading station (MEHLER *et al.* 2019, 261, 270).

Cost, risk and insurance

Merchant voyages to Iceland were a high-risk, high-return enterprise. The greatest risk was the voyage outward and back, crossing the North Atlantic, and written sources are plentiful which describe the losses of ships and crews. It was not merely the weather which posed a hazard. As noted above, hostile encounters with rival merchants or pirates posed a significant danger for merchants.

In spite of these risks, trading ships continued to set sail for Iceland, because the venture offered the prospect of considerable profit. In order to spread the risk, German merchants and those from England formed groups or joint ventures to reduce their individual investment and also placed their merchandise in more than one ship to lessen the loss in the event that the ship went down or was captured (GARDINER 2016, 88). Such groups have been mentioned above and were known in MLG as a *maschup*. These came into being to serve a specific goal and only for a limited period of time. The older form was a *wedderlinge* for which no goals were defined. A few *maschup* contracts from the 16th century have survived which show that city councillors or burgomasters could also join such a group (HOLTERMAN 2020, 329-337). Similar ventures were formed by English merchants, such as that which financed the well-documented voyage of the *James* of Dunwich in 1545 (COOPER 1939).

Much less is known about the operation of enterprises at an earlier period. Norwegian merchants who traded with Iceland in the Commonwealth period operated in trade alliances as well (ON *félag*) in which several partners had a share of a ship and of the cargo. The owners were called ON *stýrimenn*. Such groups were also formed between foreigners and Icelanders. For example, the Laxdæla saga tells of the Icelandic, Þorleikr Bollason who had a share of a Norwegian ship (EBEL 1977, 16-17).

Trust and jurisprudence

Trust was essential in the overseas trade. Friendship was one of the bases of trust, but the more important basis was family relations, together with established traditions of merchants and merchants' family visiting the same site, or area of Iceland. Brothers, fathers and sons, cousins and wives (see below) were often involved in joint overseas ventures. Throughout the medieval period, wealthy and powerful chieftains and their families formed friendships with foreign merchants and these bonds were essential for international trade in Iceland (EBEL 1977; JAKOBSSON 2007, 144-145).

In the first centuries of the Icelandic colony, the bonds with Norway were especially strong due to the fact that most settlers had emigrated to Iceland from Norway and maintained their links with the former home (SIGURÐSSON 2017). At a later date, foreigners that came to Iceland for trade were embedded in family and friendship networks in their home countries. This has, for example, been investigated for the Hanseatic world, where the trading companies were based on family bonds (*i. e.* SELZER/EWERT 2010, 36-37). For the German merchants in Iceland it was essential to trust their clients and maintain a good relationship, especially because, as noted above, the Icelanders either paid for their goods in kind or established credit (HOLTERMAN 2020, 168).

It was inevitable that conflicts arose before, during and after negotiations and meetings between merchants and their clients. Foreigners in Iceland fell under Icelandic jurisdiction and had to follow their laws and regulations. *Grágás* reveals that there was parity in the way Icelanders and foreigners were treated: "Laws are the same for our countrymen as for foreigners." (DENNIS *et al.* 2000, 359). The Icelandic codes were particularly detailed in the laws surrounding trade. They show both individual Icelandic traits but also draw upon established measures from Norway, reflecting the fact that the Icelandic law codes are rooted in those of Norway. Law cases were settled in Iceland and the outcomes then reported to those kings. In case of the death of a foreign merchant in Iceland, *Grágás* established regulations for the inheritance (EBEL 1977, 17-18).

The law cases took place at the local or main assemblies. The Icelandic assembly system initially operated on three levels: at the top was the *alþing*, followed by the quarter-*pings* and finally the local *pings* held in the spring and the autumn. The *alþing* meetings were held at Þingvellir in the south-west and lasted two weeks and were held at a set time each summer (DENNIS *et al.* 1980, 57; SEMPLE *et al.* 2020, 184-186). The case of the murdered Norwegian merchant Sigurðr, mentioned above, was settled at the assembly. The killer, Soxolf, Solmundr's brother, was exiled for the rest of his life and Solmundr was outlawed for three years (ANDERSSON/MILLER 1989, 123-125; SEMPLE *et al.* 2020, 236). In the later medieval period, German merchants attended the *alþing* to settle disputes with the local authorities, with Icelanders or with other foreign merchants. In 1527, merchants from England, Hamburg and Bremen came there to have their measures and weights confirmed (HOLTERMAN 2020, 186-187).

The law of the crew's home country was enforced during the course of the voyage, so that the Hanseatic maritime laws were applied on German vessels. More generally, maritime law in northern Europe was largely based on the Laws of Oleron, drawn up around 1200, according to which the

⁸ Calendar of the Manuscripts Preserved at Hatfield House, 13, 70-71.

captain had to keep the peace amongst the sailors and, if trouble arose, be their judge (WARD 2009, 104). However, there were many variations in the laws. Ships that arrived from Bergen or Trondheim, for example, had to use the trading laws (ON *biarkeyiarrettir*) from their home towns. The effective operation of the ship required that disputes which arose onboard had to be resolved promptly. Sailors and merchants were able to set up a ship *þing* while on board, and all decisions made at that meeting were legally binding. Fines that resulted from the verdicts were split in two: one was given to the skipper, the other to the group of sailors. The meeting held on board a ship was held at the mast (ON *við siglu*) and it was symbolised by erecting a shield. However, such *þing* meetings were not confined to the ship itself. They might be held in the harbour, or even at the end of the landing bridge of the boat (ON *við bryggjusporðr*) (FALK 1912, 5; MÜLLER-BOYSEN 1990, 141-143). *Íslendingabók* reports of a case where Norwegians had chopped off the hand of a man named Skæring at the coastal marketplace of Gásir in Iceland (MILLER 1990, 10). This seems to have followed an *ad hoc* meeting in the harbour. Meetings in harbours or on ships adhered to the practices in the section on the laws of the sea traders (ON *farmannalög*) in the *biarkeyiarrettir* which regulated urban life and overseas trade (MÜLLER-BOYSEN 1990, 117-121; STRAUCH 2011, 166-176; SEMPLE *et al.* 2020, 236).

The role of women in trade

It is hard to tell what role women had in trade in Iceland. The written sources at hand mostly mention men, and the interpretation of the archaeological record is equally biased in this respect. However, a couple of glimpses can be found. As mentioned above, the Icelandic term for a merchant or trader is *kaupmaðr* or *farmaðr* but in ON *maðr* can mean both a man, or a human being in general, including women. From saga literature we know of wandering salespeople (ON *mangari*), a role which – in theory – could also include women. As mentioned above, they sold goods they made themselves or had bought on farms, or which they had bought from foreign merchants at the trading sites. *Njáls saga* tells of Mord Valgardsson who reports of wandering saleswomen who travelled the districts with haberdashery (ON *smávaring*). The implication of the text is that these women were of the lower social stratum (EBEL 1977, 4).

The role of women in Iceland seems to have depended considerably on whether they were married or not, and this applied equally to their involvement in trading business. For example, according to *Grágás*, a woman was allowed to sell goods at the markets, but only if her husband was unable to come and had given her permission (CARTER

2015, 275). However, sagas mention several cases of women who took political actions on their own or divorced their husbands (MAGNÚSDÓTTIR 2008, 46). To a large degree, their power and also their access to take part in the assemblies depended largely on their marital status (SEMPLE *et al.* 2020, 263). As we have heard above, women produced the currency cloth named *vaðmál*, so it was women who quite literally made money, which might have provided them with some power (HAYEUR SMITH 2013, 738).

Women of higher rank may have been more independent. Aud the Deep-Minded (*Auður djúpúðga Ketilsdóttir*) was a powerful woman of the settlement generation. She owned a ship and travelled widely, including to Orkney (JESCH 1991, 82-83) and there is other written evidence that Icelandic women were active in trade in Bergen (JESCH 2001, 60).

Not much is known about the wives of foreign merchants and they rarely appear in written sources. For example, in the Hanseatic period, we know of merchant widows who took over the business of their late husbands, when, for example, their ships did not return from Iceland. In order to do that, it was not necessary to re-marry. In addition, the wives of merchants ran the business in the home ports while their husbands were in Iceland (HOLTERMAN 2020, 368-370). Written sources also indicate that in a few instances German merchant wives sailed to Iceland and even owned a ship (HOLTERMAN 2020, 369). Without their company, German merchants had relationships with Icelandic women although this was prohibited, at least in the second half of the 16th century. Relationships that led to marriage were permitted. For example, Hamburg merchant Henrik Gerkens Hannesson married an Icelandic woman, Jarþrúður Bjarnanóttir Sumarliðarsonar, but it is not known whether she then took part in his trading business (KOCH 1995, 60).

Conclusion

Trade with Iceland operated in an effective manner from the settlement of the country until the establishment of the commercial monopoly by the Danish authority in the early 17th century. However, as the trade grew in importance economically, the power to regulate and manage it moved progressively to higher authorities. It slipped away from the chieftains, to the *þing* and then out of Icelandic control to the Norwegian and Danish kings. The Danish monopoly of the 17th century, although mercantilist in conception, was simply a further stage in the close regulation of trade which had applied from the outset.

Trade was so important, both economically and socially, to life in Iceland that it had to be managed to ensure that it provided benefits for all parties.

Internally, the production of commodities for trade had to be regulated, because the exchange system was built around items of common value. The basis of coinless exchange was that it was possible to standardise Icelandic items, whether cloth or fish, to act as a system of measure of value. Imported commodities could then be measured against these standards.

Regulation underpinned every aspect of the trading system, since value could not be determined in the market. This was advantageous for the incoming merchants. Even though price-setting might take place each year, the merchants knew the broad value of goods and could assess the profitability of the distant market on Iceland. The whole system was made practical by the advance of credit, and that in turn assumed that voyages were made year after year, so that the debt could be redeemed. The risks of the voyage to Iceland were off-set by the stability of the market once the ships had arrived. Regulation which governed the harbours used by traders and places of trade, the systems of exchange and the management of foreign traders, were all set in place to provide a workable system. Iceland throughout the seven centuries considered here sought to obtain the advantages of foreign imports, while very carefully controlling the consequences which came with trade and the presence of traders.

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Technologies of trade in western Asia in the Middle Bronze Age

by GOJKO BARJAMOVIC

Mesopotamia, Anatolia, Bronze Age, cuneiform, merchants, trade infrastructure

The exceptional survival of a large body of commercial archives from the site of Kültepe in modern-day Turkey reflect a system of traders and their commercial transactions during the Bronze Age. The detailed records allow scholars to reconstruct the physical and commercial infrastructures and technologies used by the traders and their contemporaries, and to give a relatively detailed picture of the ‘tools of the trade’ – including writing implements, weights and balances, containers, vehicles and more. The merchant accounts provide the documentation of one trade route and its auxiliaries, and a single solid dataset for postulating the existence of several such high-intensity trans-regional commercial circuits across western Asia just after 2000 BC.

Handelstechnologien in Westasien während der Mittelbronzezeit

Mesopotamien, Anatolien, Bronzezeit, Keilschrift, Händler, Handelsinfrastruktur

Textarchive zu Handelsaktivitäten vom Fundplatz Kültepe in der heutigen Türkei, die außergewöhnlich gut erhalten sind und in großer Anzahl vorliegen, spiegeln ein System von Händlern und ihren kommerziellen Transaktionen während der Bronzezeit wider. Die detaillierten Aufzeichnungen ermöglichen es Fachwissenschaftlern, die physisch erhaltene und kommerziell erschließbare Infrastruktur sowie die Technologie zu rekonstruieren, die von den Händlern und ihren Zeitgenossen genutzt wurden. Somit kann ein relativ detailliertes Bild der „Werkzeuge des Handels“ gewonnen werden – einschließlich der Schreibgeräte, Gewichte und Waagen, Behältnisse, Fahrzeuge und vielen anderen Dingen. Die Abrechnungen der Händler ermöglichen die Dokumentation einer Haupthandelsroute und von Nebenrouten. Die Texte stellen einen einzigartigen und soliden Datensatz dar, um die Existenz mehrerer solcher stark genutzter transregionaler Handelskreisläufe durch Westasien kurz nach 2000 v. Chr. zu postulieren.

The Old Assyrian commercial system is the best-documented example of a long-distance trade network (Fig. 1) surviving from the Bronze Age (BARJAMOVIC 2018). The term 'Old Assyrian' refers to a historical period *c.* 1950-1750 BCE in Northern Iraq and Turkey, as well as the linguistic stage and material culture associated with it (LARSEN 2015). In archaeological terms, it is coterminous with the early Middle Bronze Age in Turkey (KULAKOĞLU 2011). Geographically, it is focused on the archaeological site of Kültepe near the modern-day Turkish city of Kayseri (ÖZGÜÇ 2003). More than seventy seasons of archaeological excavations at the site have unearthed the remarkable remains of a thriving Bronze Age city that bore the ancient name of Kanesh. The settlement probably covered an area of at least 150 ha (BARJAMOVIC 2014). It consisted of an acropolis with temples and palatial structures (Fig. 1a,A), surrounded by a lower town with compact industrial and residential quarters (Fig. 1a,B-F) enclosed by a fortification wall. An estimated 20,000 people lived in the city. So far, archaeologists have unearthed 9 ha of narrow winding streets, small squares, and more than a hundred multi-storied houses (Fig. 1b). The settlement was destroyed in a conflagration around 1840 BCE, thus sealing a generation of houses under burnt rubble and preserving its remains for posterity.

In addition to its local population, Kanesh was home to a merchant colony of about a thousand people (BARJAMOVIC *et al.* 2012, 60) from the oligarchic city-state of Assur on the Tigris River in modern-day Iraq a 1,000 km to the south (LARSEN 2000). They were engaged in an extensive overland trade in raw metals, wool, and luxury textiles (VEENHOF 2008a). Their settlement at Kanesh was the main hub for three-dozen additional ports of trade spread across Central and Southern Anatolia (BARJAMOVIC 2011).

The Old Assyrian commercial system is documented through a corpus of 23,500 merchant records written on clay tablets (Fig. 2) excavated in the private archives of the houses at Kültepe (MICHEL 2003). This material offers detailed insight into the way large commercial structures could function over long distances. The closest structural parallels to these records are found in the medieval town archives of the North Italian city-states and in the Cairo Geniza (LARSEN 1976, 92-97).

The trade was based on long-term free stock enterprises and financed by private capital managed by risk-based and profit-seeking individuals. Traders made use of silver bullion and bearer's checks as means of payment (VEENHOF 1997). They engaged states and individuals across several cultural and linguistic zones, and managed their exchange across diverse systems of measurement, including weight, quality, and calendars.

A number of factors appear to have been decisive to the way this commercial system was formed and came to function. These include 1) a network of international agreements regulated by treaty where cities along the routes would levy taxes in return for a guaranteed safety of passage as an alternative to insurance; 2) a physical infrastructure that allowed the movement of people and goods in great quantity, including paved roads, bridges, guarded passes and political borders; 3) a surplus capital and workforce in the area travelled by the traders; 4) a network of permanent settlements of Assyrian agents to handle and sell the goods; and 5) a system of communications that allowed the movement of information through space.

Traffic was measured in several hundred donkey-loads per year (STRATFORD 2017, 291-315). Commerce was built on established procedures and allowed the formation of long-term partnerships and the settling of permanent commercial agents abroad (LARSEN 1977). The system had seemingly evolved from an earlier venture trade in which single caravans journeyed to market cities in commercial one-off investments (BARJAMOVIC *et al.* 2012, 62). It reverted to venture trade after less than a century of agent-based commerce, now between two separate, but linked communities of traders in Assur and Anatolia connected by a professional class of transporters. The main bulk of our documentation dates to a single generation of traders from the period of agent-based commerce (BARJAMOVIC *et al.* 2012, 75-78).

The Assyrian term for a trader was the deverbal noun *tamkārūm*, derived from *makārūm* 'to trade'. No distinction was made between creditors, traders, merchants, or retail-sellers. Their native language was a northern dialect of Akkadian that would likely have been intelligible to most people living south of the Taurus and Zagros mountains between the Persian Gulf and the Mediterranean Sea. The region of Central Anatolia where the men of Assur went to trade was linguistically more diverse with speakers of at least the two distinct Indo-European languages Hittite and Luwian, as well as the unrelated isolates of Hurrian and Hattian (GARELLI 1963). Texts rarely make reference to interpreters, and it seems that the foreign traders for the most part relied on their own skills of communication. All three named interpreters attested in the corpus bore Assyrian names (VEENHOF 2008a, 224). Just one text refers to an individual capable of reading in a foreign language.¹

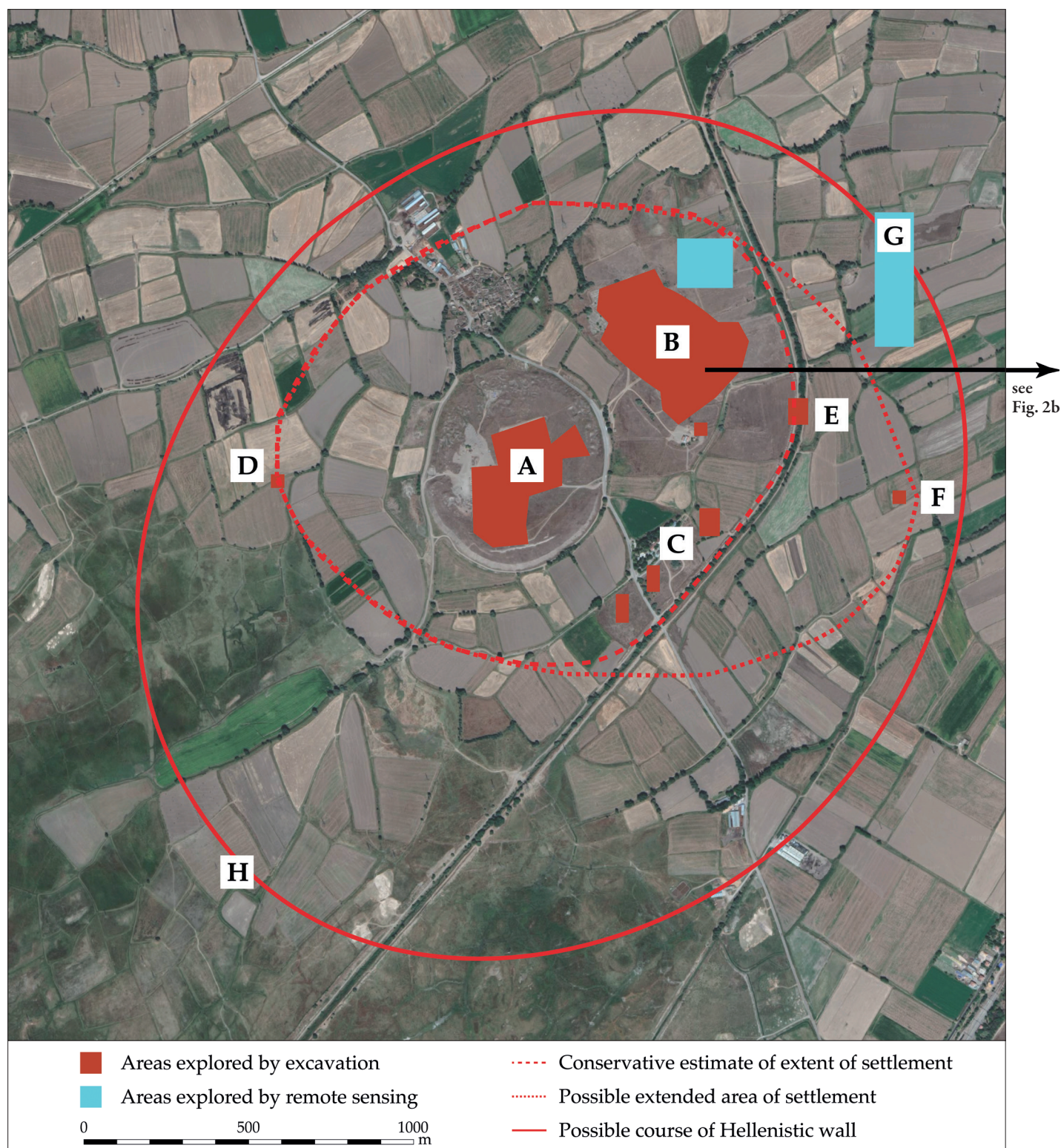
Several systems of weight, measurement, and numeracy were in use in Central Anatolia (ZACCAGNINI 2000; DERCKSEN 2016). Texts distinguish the common Mesopotamian unit of weight from the 'stone of the Land,' (DERCKSEN 1996, 86), 'the palace' (BILGIÇ 1998, 477), and other local units (EROL 2016). The latter includes the 'stone of

1 AKT 8.271: You must give the tablet to a scribe who knows Hurrian so that he can read it.



Cartography by Ivan d'Hostingue and Gojko Barjamovic 2010

◀ *Fig. 1. Map of the Assyrian ports and stations, and the routes connecting them ca. 1870 BC. The exact location of many of these places is disputed. The map also shows the principal goods and their directionality in the system: commodities entering, circulating, and leaving the part of the trade network managed by the merchants from Assur (BARJAMOVIC 2011).*

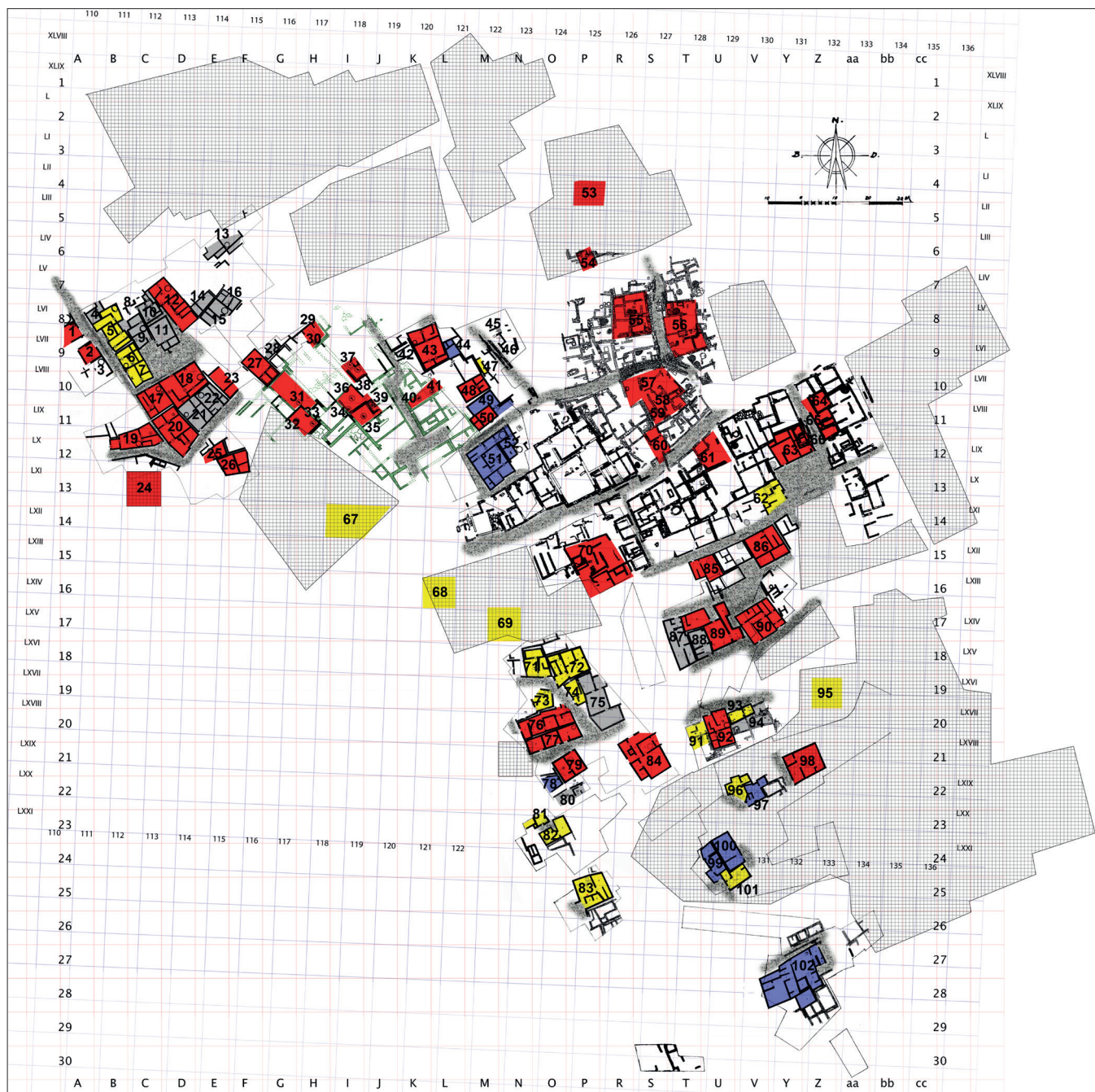


▲ Fig. 2a. Site plan of Kültepe, ancient Kanesh. The extent of the site has not been systematically investigated. A conservative estimate is represented by the broken line (BARJAMOVIC 2014).

Purushaddum, a city that appears to have been located on the western margin of the Assyrian network and which, also collected its taxes using the decimal system (BARJAMOVIC 2011, 375-376). At Kanesh, taxes were calculated in the sexagesimal system that originated in Mesopotamia.

We know too little about other measuring units to make regional distinctions, but may note that the Assyrians and the locals agreed on standards of value, with silver and gold bullion serving as

the base currency (DERCKSEN in this volume). Amorphous materials were evaluated primarily for their material value, as opposed to quality, craft, or the time that went into making them (DERCKSEN 2016). That said, a range of qualifiers were used to distinguish qualities of wool, textile, and metal. These include geographical origin, adjectives referring to color, bonity, purity, and shape (LASSEN 2010; MICHEL/VEENHOF 2010; EROL 2019).



Scales and weights were used for weighing out trade objects and metal currency. Texts refer to quantities down to half-grains.² This corresponds to $\frac{1}{360}$ of a shekel or about 23 mg and presumably is far below the tolerance of the weights used in physical weighing. Such references probably therefore always relate to fictive (currency) values, and not physical amounts. The study by POWELL (1979, 83) of Mesopotamian metrology found that ‘Mesopotamian weights tolerated an inaccuracy of about 3 % of the mass of the object being weighed,’ which would seem to accord with the excavated examples from Kanesh (DERCKSEN 2016). The existence of several weight systems and

2 AKT 3:93, 9: 31 ma-na 14 $\frac{1}{3}$ GÍN 7 $\frac{1}{2}$ ŠE KÙ.BABBAR-
 áp-su and Kt n/k 250, 12-16: $\frac{1}{2}$ GÍN 22 $\frac{1}{2}$ ŠE KÙ.BABBAR
 ... i-ri-ha-am.

later abrasions complicate matters (KULAKOĞLU 2017).

Merchants brought their own weights to Kanesh where they are often found in houses and tombs. Caravan leaders and other itinerant merchants presumably had to carry weights and probably also scales during their journeys as they were required to weigh out precise and always varying payments for tolls, inns, and other transport expenditures (BARJAMOVIC 2011, 11-26). A particular sum called the 'hand tin' was set aside for this purpose as a proportion of each shipment leaving Assur (VEENHOF 1972, 257-346). Copper was often used as means of payment inside Anatolia. Silver on the return trip to Assur.

Weights come in all shapes and sizes, including simple geometric forms and complex animal shapes

Fig. 2b. Close-up of area B shown on Fig. 1a. A complete plan of excavations is not available, but the image compiles all published information. Walls of domestic houses shown in black. Paved streets are dark grey. Grey areas were excavated but not published. House plans highlighted in red contained archives that can be attributed to merchants coming from Assur. Those in purple represent local archives. Those in yellow are not attributable (HERTEL 2014).

(KULAKOĞLU 2017). Surviving examples are fashioned out of various types of hard stone and lead. Weights shaped like ducks or frogs are of Mesopotamian origin. Scale pans of bronze have been recovered from the houses at Kültepe (KULAKOĞLU 2017, 350) and their use is illustrated in scenes carved on seals. No weight beams have been identified so far.

Data on Assyrian weights and their manipulation in the textual record were studied by VEENHOF (1972) and DERCKSEN (2016). The latter concluded that the majority of the weighing stones excavated in the lower town at Kanesh reflect the Assyrian standard based on a mina that was about 10 % heavier than the local Anatolian one. Most published weight stones range from $\frac{1}{2}$ shekel to 2 minas. The two heaviest examples weigh 4250 g and 5250 g respectively. One text mentions an Assyrian 10 mina weight, *ešartum manā'um*.

Verification must have taken place according to institutional standards with paradigms probably stored in the Assyrian Port Office and in the main temple of Assur back home. Weights belonging to certain individuals were known to be slightly off, and were therefore used with a fixed calibration (*takittum*). Such inaccuracies caused particular problems when tiny amounts of silver or gold were weighed. By listing the specific weight stones used, a negative effect could be counteracted by using the same stone again for a later return on the same transaction. The collection by DERCKSEN (1996, 85-86) of known calibrations show that deviations ranged between 0.4 % and 2.1 % with a median of 1.1 %.

Inaccuracies in weighing seem to have ranged well below issues of quality control, particularly of the precious metals. Without coinage or a guarantee of purity, accepted payments made in metal would to some extent have to rely on trust. Letters occasionally report on cases where metal was smelted in order to determine its purity. Exchange rates between metals were based on perceived notions of quality and were fairly standardized. Local variations created the arbitrage pursued by the traders.

Knowledge of qualities, exchange rates and fluctuating market prices are occasionally reported in the correspondence and many be assumed to have been a standard part of a trader's knowledge. Such knowledge was backed by training in numeracy a standardized vocabulary found in a handful of school-texts from Kültepe and in Assur (BARJAMOVIC 2015). Training in basic numeracy and literacy included the introduction to a standard phraseology of objects, qualities and transactions, as well as mastering fraction arithmetic and calculations of cumulative interest. A high degree of standardization in format, sealing practices, ductus, genre and style across the corpus suggests a high degree of uniformity in the training. On the other hand, there seems to have been no standardized form of bookkeeping, and traders often struggled

with determining their total assets and liquidity (BARJAMOVIC *et al.* 2012, 72-73).

An extensive infrastructure was the prerequisite for operating the trade, even if direct references to such infrastructure are rare in the textual and material record (BARJAMOVIC 2018). The term 'infrastructure' is used here in a broad sense to include A) political infrastructure (moderating institutions, state treaties, security, and taxation); B) industrial infrastructure (for the production of food, tools, saddling, wrappings, breeding of donkeys, wagons, containers, timber, reed, ships, ropes, sails, other equipment); C) intellectual infrastructure (such as financing, credit, agency, insurance, schooling, and commercial technology); and D) physical infrastructure (roads, bridges, mountain passes, guardposts, inns, and a postal system).

A) Political infrastructure

The Assyrian system was based on trading communities of private agents who maintained legal and financial institutions independent from the society in which they settled (VEENHOF 2008a). The political scene in Anatolia and Northern Syria at this time was one of constant power struggles, warfare, and changing alliances between leagues of cities. The merchants frequently refer to the disruption of trade owing to conflict (BARJAMOVIC 2011) and the Assyrians ventured to protect and facilitate their businesses by creating a network of sworn agreements with local rulers (VEENHOF 2013). In return for the permission to found colonies with extra-territorial rights, as well as the protection of passing caravans, the traders offered revenues and the right of pre-emption on their merchandise at favorable prices. In areas where fully formed states did exist, the interaction between state institutions and trade appears to have been symbiotic and often a politically creative force.

B) Industrial infrastructure

Various industries would have existed to support the trade in Assyria. Only indirect evidence for trade exists in the surviving records, but their existence must be taken for granted on the basis of the extant sources. For instance, the texts from Kültepe show that most of the donkeys used to carry the goods from Assur were sold along with their equipment once the merchandise reached its final destination in Anatolia. With hundreds or even thousands of animals in demand each year, there must have been an extensive industry of donkey breeders and trainers, tanners, rope makers, harness makers, saddle makers and smiths catering to the traders for whom information is otherwise scarce. Similar supporting industries would have existed elsewhere for the production of bitumen, reed and timber for shipbuilding, or for wheelwrights and cart makers. And finally, of course, the hundreds of luxury textiles sold each year required herding, plucking, spinning, coloring, weaving on an almost industrial scale.



C) Intellectual infrastructure

The Assyrian trade was organised as a combination of family businesses and long-term commercial partnerships with outside financing. Numerous elements characteristic to Assyrian commercial technology include financing, credit, agency, and insurance.

Their agent-based trade required a high degree of functional literacy and numeracy so that close communications could be maintained across space (BARJAMOVIC 2015). It also led to the development of a postal service by which caravan leaders, agents, financiers, and partners would communicate quickly and efficiently (VEENHOF 2008c). In turn, literacy and numeracy came to penetrate society beyond the immediate purview of trade to also serve as a medium of communication and recording of information between women, slaves, and local Anatolians who were not involved directly in commerce (see Fig. 3 for examples).

D) Physical infrastructure

Little is known about the building and upkeep of roads, and, yet, such roads were a precondition for the large-scale commercial activities reflected in the records (BARJAMOVIC 2011). Roads are rarely

mentioned because their existence was taken for granted by correspondents. The most important indication of paved or planed surfaces is indirect and comes through references to heavy wagons used in the transport of copper.

Another key element in the physical infrastructure included were the bridges and ferries crossing the numerous rivers of Anatolia. Bridges are generally the weakest link in a road network, and they cannot be built or efficiently sustained without skilled labor. They were expensive to construct and maintain and could function as gateways for enemies as well as traders.

Guard-posts located at bridges or along roads travelled by the Assyrians are also recurring in the records. Their number and distribution suggests that barracks and forts must have been a common sight in the landscape.

When passing through distant regions with heavy cargos, the Assyrian caravans depended upon inns laid out along the main routes (Fig. 1) of Anatolia and Syria for provisions. The Assyrian caravans did not carry their own food and the caravan leader had to trust that the inns *en route* could provide the provisions required by his group. Some inns are known to have offered stabling facilities and long-

▲ Fig. 3. Sealed clay tablets, envelopes and seals from Kültepe. Letters were often enclosed in a sealed clay envelope to protect the privacy of the communication. The name of the addressee was written in front. Legal documents were likewise enveloped and sealed to protect the contents. Both letters and legal records are shown in this image (photo courtesy K. Wagensonner and the Yale Babylonian Collection).

term storage. One could buy livestock there, or take on guides and packers. Inns were essential not only for offering protection and provision, but provided the necessary precondition for large caravans to travel at an acceptable speed.

A caravan consisting of 500 donkeys and a comparable number of men would obviously have required precise organisation: the animals alone would consume around 8 t of water per day, and the challenge of feeding them would have required that detailed agreements were made beforehand with providers along the route. It is difficult to determine exactly how common inns were, but even small and rarely mentioned settlements in Anatolia and Northern Mesopotamia can be shown to have had them. This implies that a constant and lively traffic was the rule and shows that the inns must have depended on traffic other than the occasional Assyrian merchant.

Services provided by inns were paid for in cash metal, and the flow of traders spending part of their proceeds *en route* through Syria and Anatolia, must have transformed the economy of the region affected by the traffic. Each donkey would consume an average 3 kg of high quality fodder and 20 l of water each day. In Northern Syria, where hundreds of Assyrians and their donkeys passed each year, the demands for food and water of an inn catering to the caravans would have equaled that of a village. Its presence must have had notable consequences for local agricultural production and networks of distribution. Manufacture would have been restructured to accommodate the consumption, and the inns would have tied down part of the available local work force (on a seasonal basis at least) with a lasting effect on the economy of the roadside communities. It is important to note that none of these effects on society are directly visible in the material or written record. But its very existence demands that they were present.

A characteristic trait of the Old Assyrian system seems to be its high degree of political and economic specialization, made up as part of a package that included technologies of collective governance, literacy, diplomacy, communication and financing (BARJAMOVIC 2018). This went hand in hand with a developed system of agency and legal mediation (HERTEL 2013). Commerce was built on private initiative, but dependent upon state support and facilitation. The small size of the polity effectively meant that the same group of individuals shared the roles of agents, financiers and legislators. All actors were closely related in terms of kinship, which meant that a system could be built on mutual trust instead of competition (YOFFEE/BARJAMOVIC 2018). This allows us to define the entire city-state of Assur as a single corporate entity in external competition with a number of similarly organised political units.

But the overall pattern of mobility and the volume traded was by no means unique to the Assyrian corporation. We can trace these routes and their development from the Early Bronze Age and argue the gradual establishment of what was essentially a multi-layered and multi-centered structure of interlocking circuits, which, in spite of not being in direct touch, formed an interdependent organism in which events at one end affected conditions at the other (BARJAMOVIC 2018). Developments in the material record can be used to support the notion gained from the Old Assyrian texts that commercial structures built up during the late 3rd millennium primarily by state actors led to an explosion in the use of metal in common households just after 2000 BC.

Records from Ebla dated to the 24th century BC (STEINKELLER in this volume) yield references to huge amounts of silver that can only have originated in Turkey (EZER 2014; KULAKOĞLU 2017; BARJAMOVIC 2019), and it now seems clear that the rise of grand palatial buildings in Central Anatolia in the 25th century BC – including those at Yassıhöyük, Kültepe and Karahöyük – should be linked to a dialectic development of political centralization and long-distance trade (ARCHI 2017). This picture fits with the growing corpus of current research by Turkish archaeologists (ŞAHİOĞLU 2005; EFE 2007; ERARSLAN 2011; SARI 2012), who track deep qualitative changes in settlement structure, pottery assemblages, routes and exchange patterns in the Euphrates Valley and western Anatolia around this time. Records from Ebla listing tons of silver have serious implications for the political and economic infrastructure of the region that produced the metal. As in the Old Assyrian case, we must reconstruct a network of settlements, production sites, and polities able to manage the mining, processing and transport (WINTERS 2018).

The centers that managed such operations can not have been trivial players. During the late 3rd millennium, Iran, Anatolia, Central Asia and the Gulf coalesced into powerful political and population centers in their own right. This allowed the formation of long distance overland and maritime networks of exchange as well as the required extraction of metal on a hitherto unseen scale.

As shown by RAHMSTORF (2011), the weight systems in use during the late 3rd millennium BC from the Aegean to the Indus, though following local standards, converged and were synchronized with each other as a result of interconnected, large-scale trade. The Assyrian caravan accounts provide the documentation of one trade route and its auxiliaries with a single solid dataset for postulating the existence of a high-intensity trans-regional commercial circuit just after 2000 BC. Its 'weights and merchants' provide one singularly detailed early example of exchange and convergence that is likely to have been common in many of the ancient cases presented in this volume.

APPENDIX

This appendix presents translations of seven documents (Fig. 4), written on clay tablets in the cuneiform script that come from archives belonging to merchants from Assur in modern-day Iraq who had settled at the site of Kültepe (the ancient city of Kanesh) in Central Turkey. Originally, all seven would probably have been enclosed in envelopes, such as those seen in Fig. 3. Tablets a and b still have faint markings of the thin gauze textile that once separated the tablet from the clay envelope.

The seven texts are selected to illustrate different aspects of the commercial ventures undertaken by foreign merchants, including the arrangement of a transport of earnings from Anatolia to Assur, a message from Assur notifying commercial agents in Kanesh of an approaching shipment, a copy of an account sent from commercial agents in Kanesh to their superiors in Assur about the sale of goods, two commercial letters discussing matters of trade, and two legal documents relating to financial disagreements between traders. The selection constitutes a microcosm of the roughly 23,000 such documents hitherto unearthed at Kültepe.

Text a (BIN 4, 122)

Witnessed account that a transport consisting of silver, gold and a vessel going from Anatolia to

Assur is entrusted to a named carrier. The vessel could be a gift from a merchant to his wife. The metal represents currency and that can be used to pay creditors (in this case, 1 mina of silver was reserved for that purpose), cover living expenses, or to initiate a new trade cycle. A (sealed, enveloped) copy of this text would presumably follow the shipment to its destination.

5 minas from Aššur-imitti of silver – the import tax is extra, and he (the transporter) has been satisfied with his transport fee – and 2/3 mina of gold – the import tax is extra, and he (the transporter) has been satisfied with his transport fee – have been placed as a bundle in a suppannum-vessel (made) of silver weighing 26 shekels – the import tax is extra, and he (the transporter) has been satisfied with his transport fee. 1 mina of silver – the import tax is extra, and he (the transporter) has been satisfied with his transport fee – belongs to the creditor. All this I entrusted to Ikun-pia (as) witnessed by Ennam-Anum son of Amria (and) Aššur-urbi son of Budadum.

Text b (BIN 4, 24)

Message sent from Assur to notify agents in Kanesh of an inbound shipment. In accordance with regulations, the tin in the shipment is said to be under seal, except for the part reserved for

▼ *Fig. 4. Seven examples of cuneiform tablets belonging to archives of merchants from Assur who had settled at Kültepe. All seven tablets are now housed in the Yale Babylonian Collection. They represent a selection of different types of texts related to trade (Text a: transport arrangement; Text b: notifying message; Text c: account of a shipment; Text d: a letter about smuggling; Text e: a letter about marriage arrangements; Text f: a legal testimony in receipt of a loan; Text g: a legal interrogation in front of witnesses. All seven texts appear in translation in the Appendix (photo courtesy K. Wagensonner).*

*a**b**c**d**e**f**g*

costs on the road. The consignment is modest (ca. 70 kg) and carried by a single donkey. It seems to have formed part of a larger consignment led by Ušur-ša-Aššur; the authors state that if he were to decide to bring goods with him further west to Puruṣhaddum (after declaring them at Kanesh), their part of the shipment can continue with him. Records show that one could expect higher profits by doing so, but at the price of an increased travel time. There are letters, which instruct agents to sell shipments immediately upon arrival in Kanesh for speedy return and reinvestment in Assur.

From Aššur-imitti and Šu-Hubur to Pušu-ken, Amur-Šamaš son of Mišar-rabi, and Kurub-Ištar. 130 minas of sealed tin, 10 minas of 'hand tin' (for expenses on the road), 4 dark textiles (for) packing, a black donkey and its harness, all of this Ušur-ša-Aššur son of Aššur-bel-awatim is leading to you. If Ušur-ša-Aššur (wants) to enter Puruṣhaddum, then give him the tin and the textiles, let him take it into Puruṣhaddum and convert it to silver, and then let him bring the silver to me with his (own return) shipment.

Text c (BIN 4, 29)

Account in the form of a letter from an agent stationed in Kanesh to his superiors in Assur; these are the same individuals who sent Text B in the opposite direction. A detailed breakdown of taxes levied by the royal household at Kanesh upon the arrival and declaration of the shipment is followed by note on the return transport of the proceeds (see Text 1). The text employs fairly precise measurements, down to $\frac{1}{2}$ shekel (c. 2.8 g). It records a substantial 'underweight' (c. 3 %) of goods upon arrival. One may speculate about possible the reasons for this, including theft, erroneous reporting, and discrepancies in scales.

To Aššur-imitti son of Ennam-Anum from Pušu-ken. 5 talents and 20 minas (c. 160 kg) was your declared value (of the shipment when it was sealed and left Assur). 5 $\frac{2}{3}$ minas and 5 shekels per (talent) were the road fees for (the journey) to Kanesh. 30 $\frac{2}{3}$ minas (in total) accrued as fees. 15 shekels were the head tax on the (donkey) driver. $\frac{1}{2}$ mina was the transport cost in the mountains. $\frac{1}{2}$ mina for ... (and) sustenance for the driver. 8 minas were the excise tax of the palace. 11 $\frac{1}{3}$ minas was the underweight of your containers and 'hand tin.' I have deducted 51 minas 15 shekels as expenses out of the 4 talents and 40 minas that include 'hand-tin' so that 3 talents 48 $\frac{2}{3}$ minas 5 shekels of your tin was cleared (of taxes in the palace). Thereof: Ili-alum took 1 talent and Lulu took 1 talent, 2 minas 15 shekels at 9 shekels (of silver per mina), so that 6 $\frac{2}{3}$ minas 5 shekels is your silver. Thereof: I paid 6 $\frac{2}{3}$ minas 8 $\frac{1}{3}$ shekels as transport fees to Kurub-Ištar under my seal. Kurub-Ištar is bringing it to you. 1 talent 46 $\frac{1}{2}$ minas of the tin that was cleared is in my possession. Out of your 10 kutānu-textiles that

were cleared of excise tax and preemption I deposited the 8 dark textiles used in packing on your account in the Port Office. Aššur-rei deposited the remainder. Out of the 5 $\frac{1}{2}$ minas of silver that I owe you $\frac{2}{3}$ mina 6 shekels is a penalty. I paid it (lit.: weighed it) out of your tin and your textiles in the Port Office. The remainder of your silver (coming down to) 4 $\frac{2}{3}$ minas 4 shekels is in my charge. There is a šitapkum-deposit in the Port Office, and so I held back your silver, saying: 'The ... shall not drink water off' (i. e. leech on) their backs.'

Text d (BIN 4, 48): commercial letter

Private letter giving detailed instructions on how to smuggle a shipment either by sending it via a smuggler's route (*harrān suqinnim*) or by bringing the goods into town in a covert fashion without declaring it to the authorities. The letter is incomplete and a second tablet is missing. The author feels he is wasting his time waiting for the tin while there is a profit to be made on the market. He promises his associates a favorable return on the goods if only they hurry up and follow his surreptitious scheme.

To Puzur-Aššur, Tāb-šilli-Aššur, Aššur-bani, Adad-bani and Ikun-paša from Buzazu. There is no tin here for inspection with our copper. If Aššur-bani is there on the day that you hear my letter, consult with each other and let them travel on to Timelkiya to get to my merchandise; and if the Narrow Track is safe, my tin and my textiles of good quality – as much as he had brought to me (from Assur) – should come to me with a caravan on the Narrow Track. If (smuggling on) the Narrow Track is not feasible, they should have the tin sent to Hurama and let either some natives of Hurama bring in all the tin in quantities of 1 talent each into town, or else let them make packets of 10-15 minas each, and then let the personnel bring them (the packages) in (to town) inside their clothes. Let them deliver 1 talent safely, then let them return and bring another talent in. Send me the first tin that arrives safely with the first shipment in the exact moment that it arrives. If Aššur-bani is not headed this way, then let Adad-bani and Kishanu-il come with the tin and send my two servants on to Puruṣhaddum. Dear fathers and lords: pay heed to my message concerning my goods in Timelkiya and do me a favor by letting the tin enter here by the Narrow Track or by smuggling and then I will be able to favor you. I will be wasting time here until they bring me the tin. There is a market for tin here. Take notice and grant me a big favor. Assign them (i. e. the tin bundles) to me, and at least 1 mina of silver will materialize (as profit). If you ...

Text e (BIN 6, 104)

A private letter from a trader to a prospective wife. The text illustrates the practical nature of marriage and the alludes to the negotiation between two families. The trade on Anatolia to a large part operated on the basis of trust, and family relations

were one of the foundations of such trust. In addition, marriage was about maintaining a household. While the men were highly mobile as a function of their involvement in the trade, women were less itinerant as they looked after the house and family. That is not to say that women did not travel often: there are plenty of records to show that they did. But they are also often seen to act as key agents for the family and its home base in relation to creditors, legal and religious authorities.

From Puzur-Aššur to Nuḫšatum. Your father wrote to me about marrying you, and so I sent out my servants and my message to your father about you and your departure. Please, on the day you hear my tablet, turn to your father there and set out and come here with my servants. I am alone. There is no one who stands by my head and no one who sets the table for me. If you do not come with my servants, I will marry a girl from Waḫšušana in Waḫšušana. [The remainder of the letter is broken, but the author urges Nuḫšatum to hurry up and come to him].

Text f (BIN 4, 111)

A brief legal record which confirms that a debt has been paid out to the creditor's representative in front of a witness appointed by the Port in Kanesh. The text speaks to a spatially flexible system of trade and credit guaranteed by witnesses provided by impartial institutions. The seizing of the hem is a symbolic action that marks the initiation of legal action.

Aššur-ṭab seized the hem of Aššur-rabi's garment and Aššur-ṭab said: 'Regarding the 21 ½ shekels of silver that you owe to my investor Aššur-lamassi: give me silver.' Aššur-rabi weighed out 21 ½ shekels of silver to Aššur-ṭab. Aššur-rabi said: 'Thus you took the 21 ½ shekels of silver for your investor Aššur-lamassi.' Aššur-ṭab said: 'I took it.' The Port of Kanesh brought me (as a witness) for these words, and I gave my testimony before the emblem of divine Aššur. Witnessed by Iddin-Šamaš son of Dalas.

Text g (BIN 4, 105)

A legal record of a brief exchange between litigants in a court before witnesses appointed by the plenary assembly of the Port of traders from Assur in Purušhaddum. A merchant has died and his heir is in the process of establishing the range of his father's outstanding claims. Legal testimonies such as this could be presented later in the legal process in lieu of the key witnesses themselves, who could be expected to have moved on as part of their own commercial activities. The text also illustrates the legal role played by the plenary assemblies and the ad hoc appointment of its members as witnesses in legal cases.

Ikun-pia brought us (as witnesses) against Ennam-Aššur son of Anninum, and Ikun-pia said: 'I am the representative. Why the death? Why the insult?

I question you on behalf of the son of the deceased. Did or didn't Sueyya leave you 40 minas of silver for safekeeping? Answer me before these (witnesses).' Ennam-Aššur said: 'You have (already) made up your mind. I will take counsel for a couple of days and then I will answer you.' The plenary assembly of the Port of Purušhaddum brought us (to witness) these words, and we gave our testimony before the weapon of divine Aššur. Witnessed by Ušur-ša-Aššur son of Akuwa, Buzia son of Bazaza, Aššur-muttabbil son of Šu-Bēlum.

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The technology of medieval maritime trade

An archaeological perspective on northern Germany and beyond

by FELIX RÖSCH

Medieval archaeology, technology of trade, medieval trade, infrastructure, ancient topography, trading sites

This paper aims to provide an overview of the archaeological references in respect of the technology of medieval maritime trade in northern Germany and, in the broader sense, northern Europe. In particular, the periods before detailed written sources in the 14th century dealing with trade are considered. The scope of the trading technologies considered here is not limited to currencies, instruments and watercraft, but explicitly focuses on the infrastructure and topography of the trading sites.

In order to present the complex and changing technologies over the course of the Middle Ages, three different trading places are discussed. Each of which has been subject to outstanding archaeological investigations and which exemplify the situation of its time: the historic Reric (Groß Strömkendorf) in the Wismar Bay, Schleswig at the Schlei and Lübeck.

At Reric, an early medieval Seehandelsplatz, a relatively small long-distance trade is demonstrated. Although in its infancy there is evidence of systematic organisation and was most likely based on barter. As early as the end of the Early Middle Ages, the introduction of the silver weight-based currency system was a major innovation. The further professionalisation of long-distance trade and the associated technological changes are demonstrated by the example of Schleswig, which was founded shortly after the middle of the 11th century. In Schleswig a waterfront topography tailored to needs of sea-borne trade was developed as well as several technologies to control trading activities. Third, the latest findings from Lübeck illustrate the further change towards an urban topography and more effective technology, which reflect the new status of the largely independent and widely networked merchant.

Die Technologie des maritimen Handels im Mittelalter.

Eine archäologische Perspektive auf Norddeutschland und darüber hinaus

Mittelalterarchäologie, Handelstechnologie, mittelalterlicher Handel, Infrastruktur, historische Topographie, Handelsplätze

Diese Abhandlung zielt auf einen Überblick über die archäologischen Hinweise hinsichtlich der Technologie des mittelalterlichen maritimen Handels in Norddeutschland sowie Nordeuropas im weiteren Sinne. Dabei finden besonders die Perioden vor dem Einsetzen einer detaillierten schriftlichen Überlieferung zum Handel ab dem 14. Jahrhundert Berücksichtigung. Die Spannweite der hier diskutierten Handelstechnologien beschränkt sich dabei nicht nur auf Währungen, Instrumente und Wasserfahrzeuge, sondern rückt explizit Infrastruktur und Topographie der Handelsplätze in den Fokus.

Um die komplexe und sich über den Verlauf des Mittelalters stark wandelnde Technologie pointiert darzulegen, wird Einblick in drei verschiedene und archäologisch herausragend untersuchte Handelsplätze gewährt, die jeweils exemplarisch für die Situation ihrer Zeit stehen dürfen: das historische Reric (Groß Strömkendorf) in der Wismarer Bucht, Schleswig an der Schlei und Lübeck.

An Reric, einem frühmittelalterlichen Seehandelsplatz, wird die frühe, jedoch bereits systematische Organisation eines noch relativ überschaubaren Fernhandels demonstriert, deren Grundlage zunächst der Tauschhandel gewesen sein wird. Bereits im ausgehenden Frühmittelalter kam es mit der Einführung der auf Hacksilber beruhenden Gewichtsgeldwirtschaft zu einer bedeutenden Neuerung. Die weitere Professionalisierung des Fernhandels und die damit einhergehenden technologischen Veränderungen werden am Beispiel des kurz nach der Mitte des 11. Jahrhunderts neu gegründeten Schleswigs dargelegt, dessen Wasserseite eine auf den seegestützten Handel und seine Akteure zugeschnittene Topographie aufweist und das bereits zahlreiche Technologien zur Kontrolle des Handels kannte. Als drittes und letztes wird anhand der jüngsten Befunde aus Lübeck der weitere Wandel hin zu einer städtischen Topographie und effektiveren Technologie verdeutlicht, die den neuen Stand des weitgehend unabhängigen und weit vernetzten Kaufmanns widerspiegelt.

Introduction

Trade practices during the Middle Ages are characterised by an ongoing professionalisation and specialisation. Growing population, urbanisation, christianisation and innovation all had their impact on how trade and exchange was conducted. This becomes especially apparent by the seaborne exchange, which first and foremost was long-distance trade. Waterways, harbours and infrastructure shaped the arena for a variety of actors. While trade mechanisms became more professional over time and the amount of exchange constantly increased, the arenas underwent major changes throughout the Middle Ages. Routes were changed, ports founded, currencies established, vessels invented and waterfront layouts adapted. While some technologies were successfully adjusted to new needs, others ceased to exist. An increase in material culture, which has been preserved by favourable waterlogged conditions, provides large amounts of data for the study of medieval maritime trade technology, as demonstrated at landing sites, waterfronts, ports, ship wrecks and beyond.

The archaeological material related to the technology of trade has been published extensively (DÜWEL/JANKUHN 1985; DÜWEL *et al.* 1987; JANKUHN 1989; BOE/VERHAEGHE 1997a; 1997b; GLÄSER 1999; BILL/ROESDAHL 2007; STEUER 2009). However, the focus is usually on the finds or aspects of mobility while the topography of trading places as well as infrastructure are not taken into consideration. At most, these are discussed briefly and only as background information to the find. Even though efforts have been undertaken to highlight topographical aspects of seaside places in terms of trade (*cf.* BILL/CLAUSEN 1999; GLÄSER 2004), the aspects are rarely looked at in conjunction (SINDBÆK 2007; 2017).

This article aims to provide an insight into the technology as a whole, including topographical issues, focussing on northern European waters. As it has been expressed by the editors of this volume (*cf.* RAHMSTORF/BARJAMOVIC in this volume), the term “technology” is understood in a broader sense comprising tools as well as varying types of infrastructure. Due to the wealth of material, a full overview of the archaeological evidence for medieval maritime trade technologies cannot be given here. Too diverse is the situation in different parts of Europe, too massive are the changes occurring within the 1,000 years of the medieval periods, too numerous are the archaeological remains. In addition, there is a strong increase of written records by the 14th century at the latest, which enables scholars to draw more detailed pictures of trade mechanisms than for earlier periods and are a field of study on their own. For this reason, the article will focus on different situations in northern Germany which shall act as case studies for three periods, highlighting mechanisms of maritime trade in their contemporary context.

These situations are represented by the well-researched sites of Groß Strömkendorf/*Reric* (Mecklenburg-West Pomerania, Germany), Schleswig and Lübeck (both Schleswig-Holstein, Germany). While Groß Strömkendorf is considered among the early medieval coastal trading sites, Schleswig represents a new type of high medieval port. Lübeck is regarded as the prototype for the later medieval independent merchant town. As they were all important trading sites, that remained well-preserved after their heyday, they provide manifold archaeological evidence on trade technologies. Their function as hubs in the long-distance trade networks sheds light on mercantile practices, mobility, contacts and communication. It can be said that here all points of medieval maritime trade technologies culminate. The presentation of the three sites is therefore flanked by the discussion of trade related artefacts ranging from ships, containers and currencies, to testimonials of written and symbolic communication. For a better understanding aspects of inland trade will also be considered.

Early medieval maritime trade: Coastal trading sites as a showcase

The year is 808 and the Wismar Bay in today's federal state of Mecklenburg-Western Pomerania, Germany is the arena of an outstanding event. Viking forces under the command of the Danish king Göttrik (lat. *Godofridus*) attack the prospering trading place of *Reric*, which is located at a sheltered natural harbour basin at the eastern shore of the bay (MGH SS 1, 195; MGH SS rer. Germ. 6, 126). The Danes surprisingly did not do what one would expect them to do: to ransack the place, murder the residents and take valuable goods with them. Instead, they targeted the merchants, forced them onto their fleet and brought them to the Danish trading site of Hedeby. This action resulted in a distinct commerce boost for Hedeby and is considered as the first known active intervention into trade mechanism by a ruler in the Baltic (ADAM 1996, 172; MÜLLER-BOYSEN 2007, 181). Despite Frankish sources mentioning the destruction of the *emporium reric*, there no direct archaeological evidence for such an action. The place was not able to revive and was abandoned shortly afterwards.

This episode also highlights the importance of *Reric* for the Baltic trade. Extensive excavations close to today's village of Groß Strömkendorf, Blovatz municipality, have revealed a site of more than 20 ha. This has been identified as the most probable location of *Reric*. The site stretches almost 1 km from North to South and consists of a burial ground, a settlement area running parallel to the shore, and a harbour (Fig. 1). Dendrochronological analysis of more than 70 wells provided precise data to establish the site's chronology (TUMMUSCHEIT 2011, 5-12).

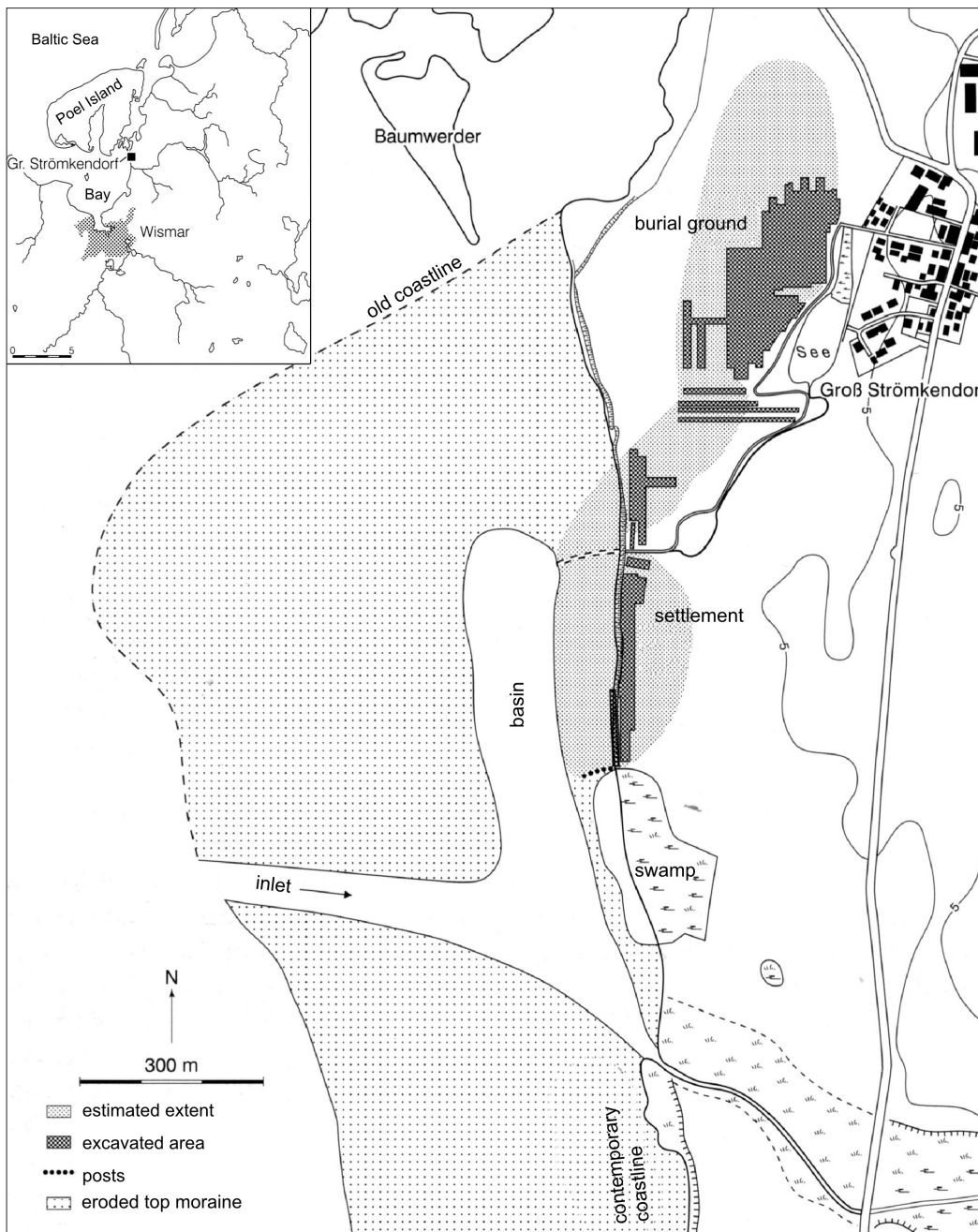


Fig. 1. Topography and excavation areas of Groß Strömkendorf (TUMMUSCHEIT 2011, fig. 1, 3).

The topography underwent several remarkable changes. In the first half of the 8th century, the settlement started out in the northern part of the area with an irregular arrangement of ten pit houses. They were most likely accompanied by larger buildings such as log-houses, some wells and numerous pits. Concentrations of similar structures were also found at various other locations and it is likely that the early settlement consisted of several nuclei. Whilst irregular layouts, ground-level buildings and pit houses with fire places in the north western corner are typical elements of regional Slavonic settlements, there is also a Scandinavian influence. Several pit houses had gable-topped posts, quite typical of the southern Scandinavian pit house tradition. Until 750/60, the whole site was settled in a sporadic manner down to a swampy area in the

south, beneath the natural harbour basin (TUMMUSCHEIT 2011, 155-157, 173-174).

Around 760 a major change can be recorded at the site (phase II). The northern part of the settlement was torn down and replaced by the burial ground (see below). South of, and in close proximity to the burial ground, an area was developed in a grid pattern, which clearly distinguishes itself from the former layout. Pit houses, pits and a post construction were arranged along two axes – one running from north-south and one from east-west. The centrepiece of the grid pattern were lined-up pit houses, now larger with a sharp rectangular outline, attributes which may be attributed to a Frankish-Saxonian influence. In addition, a 6 m wide street, evidenced by an almost featureless strip, ran from north to south and a tree sanctuary,

► Fig. 2. The arrangement of pit houses (grey) indicate a regular grid pattern in Groß Strömkendorf (KLEINGÄRTNER 2014, fig. 51).



interpreted as a ritual site had been erected (TUMMUSCHEIT 2011, 158-159, 174-175).

From 780, a third phase can be recognized at the site, which is contemporary with further topographical changes. The focus of the activities shifted to the southern part of the area, to a strip of almost 300 m in length, running parallel to the harbour basin and framed by a brook in the north and the swamp in the south. The same regular settlement pattern as in the second phase has also been found here. Rows of pit houses, surrounded by settlement pits, wells and evidence of ground-level buildings were also recorded. In each row, the pit houses were arranged at a distance of 5-10 m from each other, some of which indicate small properties. At least four or five plots, separated by small ditches or rows of pits, were discovered in the central section of the strip. *Ca.* 10 m wide, the plots appear to be aligned towards the bay. In a section further to the south, numerous wells of different construction types but only a few dwellings could be recovered. The area closest to the swamp features considerably smaller pit houses with an average floor space of just 6 m² (in comparison to the average 8-9 m² recorded in the areas to the north). These observations have been interpreted as a specialised settlement topography serving different needs. In terms of construction techniques, the pit houses of this period seem to be the result of a local development combining different traditions – *i. e.* Slavonic, Scandinavian and Frankish-Saxonian (TUMMUSCHEIT 2011, 52-53, 159-161, 175-176).

In 811 the latest recorded activity took place and Reric was abandoned shortly after (TUMMUSCHEIT 2011, 176).

Although the western part of the settlement fell victim to coastal erosion, the topography of Reric remains highly characteristic for an early medieval coastal trading place. The site is located at a sheltered spot in the Wismar Bay with access to the Baltic and developed from essentially a rural site into an organised trading place. This is demonstrated by the pit houses which follow a straight grid-pattern as well as main pathways that run parallel to the shore (Fig. 2). In addition to the pattern, which probably signifies the existence of small properties, rectangular plots were also aligned towards the harbour basin. Whilst these areas are dominated by dwellings, other spots were highlighted by fewer buildings or by a concentration of wells. It is likely, that a pagan sanctuary was located in the settlement whilst the burial ground was on the outskirts.

Unfortunately, with the exception of ceramics (BRORSSON 2010), glass (PÖCHE 2005), grave goods (GERDS/WOLF 2015) and the archaeozoological remains (SCHMÖLCKE 2004) many finds have not yet been systematically analysed or published. This makes it difficult to link certain activities to distinct spaces. Nevertheless, there are many finds including raw materials and unfinished products that indicate specialised craftwork production

which is also a central criterion for early medieval trading places (STEUER 2002). It can be assumed that people in Reric worked with amber, bone and antler as well as glass and metals such as lead and gold. Spinning and weaving was also commonplace (WIETRZICHOWSKI 1993, 38, 58; JÖNS 2000; GERDS 2001, 117). The detailed analysis of almost 100 pit houses revealed a small number of finds, such as loom weights and hammerscale inside the buildings indicating craftwork. As plenty of the finds relating to craftwork stem from the immediate surroundings, it is possible to suggest in many cases they functioned as a workshop. Fireplaces, often recovered from in the inside of the pit houses, indicate domestic occupation at the same time. With sizes ranging up to 20 m², it is understood that up to eight people could have been in occupation (TUMMUSCHEIT 2011, 49-52).

The aspect of trade becomes obvious in the imported finds and foreign goods. Pieces from the west and the north dominate. The majority of finds are of Frankish-Carolingian origin, such as Reticella vessels, Millefiori beads, tesserae, Mayen millstones and coins. Approximately 10 % (more than 6,000 shards) of ceramic are of none-West Slavonic origin. They originate from the Rhineland, represented by, for instance, Merovingian Black ware, Badorf ware and Tating jugs, as well as from the coastal zones of Saxony, Frisia and Scandinavia. Grindstones and fibulas of Scandinavian origin have also been discovered (WIETRZICHOWSKI 1993, 43; JÖNS 2000; PÖCHE 2005, 70; BRORSSON 2010, 91-93).

As mentioned above, the burial ground succeeded the early settlement nuclei in the north shortly after 750 and was in use for about 50-60 years. It was fully excavated (2.5 ha) and found to comprise 241 graves with the remains of almost 300 individuals and 14 animal burials. As suggested by the pit houses, the great variety of burial rites and grave constructions confirms a mix of different traditions, with parallels to Scandinavian, Saxonian, Frisian and Baltic lands. Approximately one-third of the graves were inhumations and two-thirds cremations which, in addition to some of the (quite sparse) grave-goods, suggest South Scandinavian and Saxon and Frisian/Frankish origins. Six boat graves and barrows also point to Scandinavian influence, while the latter are also found at Slavonic burial grounds. Urns were in large parts made in the Western-Slavic Sukow type style. The presence of one chamber grave, boat burials and barrows could suggest that c. 5 % of inhabitants were of elite status (PADDENBERG 2000; BRORSSON 2010, 43-46; GERDS 2015, 225-227).

The anthropological analysis revealed a balanced proportion of sex and age among the cremations and a dominance of male and adult individuals among the inhumations. As a result of poor preservation, it was impossible to determine the sex of a large portion of the remains, which may bias the

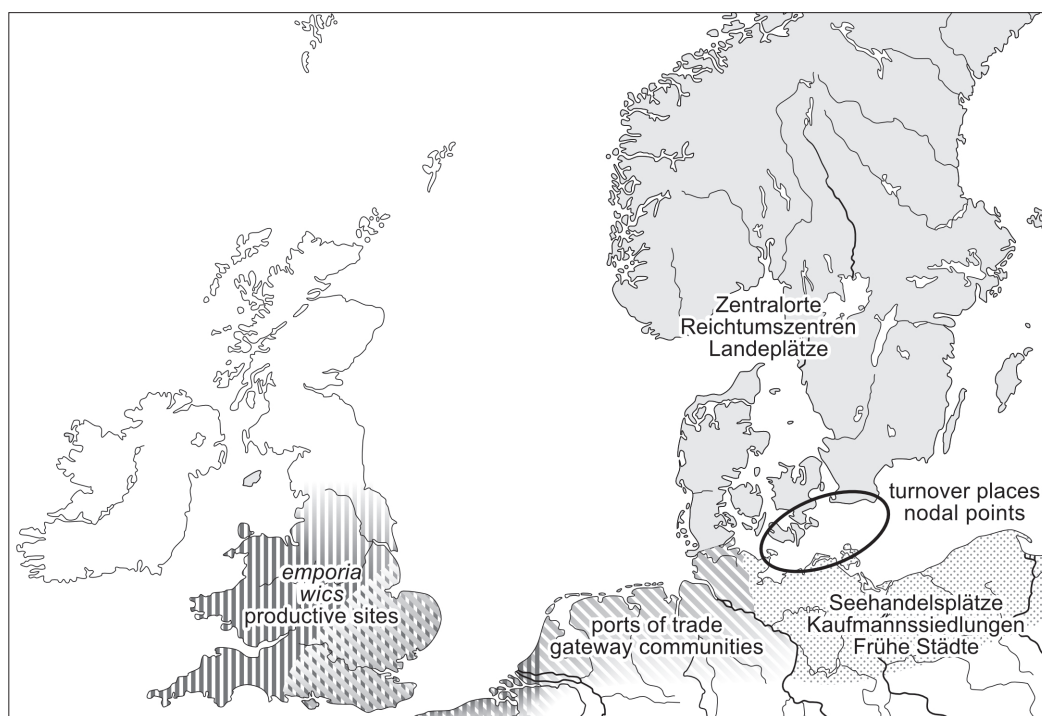
data. Additionally, four strontium isotope analyses were carried out, which revealed a northern European coastal signature (WOLF 2015). Based on this data, M. GERDS (2015, 227) suggests that the burial ground represents a permanent resident population of about 150 individuals living in family units.

Discussion continue as to whether the burial ground mirrors a multi-ethnic population or is the result of a population dominated by foreigners from Scandinavia. Of course, Scandinavian burial rites and artefacts dominate, while east-west orientated inhumations and the use of urns indicate Frankish-Saxonian and Frisian practices. This, however, does not negate a Slavonic contribution, especially when early Slavonic burial practices are considered. Burial grounds could not be detected in large parts of early Slavonic Germany, whilst the burials known were dominated by cremations without urns and rarely include grave goods (PADDENBERG 2000). This might have led to biased results.

In German research tradition, places such as Reric are defined as a *Seehandelsplatz*. These are characterised as non-rural settlements, in sheltered locations, close to the Baltic shore in the Slavic lands. They are subject to a strong Scandinavian influence, which is evident in artefacts as well as burials and dwellings (KLEINGÄRTNER 2014, 71-72, 179-180). The places are strongly linked to ship-based long-distance trade and include areas of specialised craftwork. Many terms have been used for comparable sites that can be found at the shores all over northern Europe. The terms usually highlight different aspects, for example: craftwork (*productive sites*), trade between different cultures (*ports of trade*), services for a hinterland (*central place*) or network centrality (*nodal points*) (Fig. 3). Irrespective of the different manifestations of those places, the historic term *emporium* is more or less accepted within the international research community (MORELAND 2001; cf. CALLMER 2007, 238-240 for criteria of a *emporium*).

The rise of *emporia* is a subject of discussion which is biased by different historic socio-political backgrounds (CALLMER 2007, 238-239). Some scholars hold the opinion, that they developed out of regular trading voyages along the coasts by self-organised long-distance traders (LÜBKE 2004, 92; SINDBÆK 2005; CALLMER 2007, 240). A model which S. KLEINGÄRTNER (2014, 193-199) discusses for *Seehandelsplätze* suggests that this sporadic exchange then resulted in colonies. She also argues that the access to raw materials played a central role, and that long-distance trade was the result but not the cause. Others understand the *emporia* as creations of (local) elites to gain access to luxury goods (HODGES 1989, 54-55, 70; MÜLLER-BOYSEN 1990, 153-154; ULRIKSEN 1998, 134). Commonly accepted, however, is the theory that authorities were involved when it came to the development of regular settlement patterns.

► Fig. 3. The distribution of different terms used for non-rural settlements in northern Europe (KLEINGÄRTNER 2014, fig. 16).



For Reric, we are aware of an organised topography by 760. In 808, we learn from the *annales regni francorum*, that the place was of extreme importance for the Danish kingdom, due to Göttrik collecting taxes there (MGH SS 1, 129). The Slavonic tribe of the Obotrite's, in whose territory the *emporium* was located, also had an involvement in the settlement. Their ruler Drasco, Göttrik's counterpart, controlled large parts of the southern-western Baltic coast until he was murdered in Reric in 810 (MGH SS 1, 308).

High medieval sources provide more detailed information about the tax collection practices. The so-called *Herdgeld*, a tax collected per hearth (= household), is known from continental Europe and Scandinavia. One way of distinguishing households would be to clearly divide them into individual units or plots (PIEKALSKI 2014, 73).

The plots might also have played an important role in the exchange of goods by functioning as a marketplace. Plots lining both sides of a main street in the *emporium* Ribe, Denmark, have been interpreted in this way (FEVEILE 2006, 25-35, 43-45). In this kind of marketplace scenario, the trade would have taken place in semi-public or private space, which might have, to some extent, been controlled and/or taxed by an authority. Another option could have been a beach market at the harbour basin, where transactions occurred on and at the beached ships. This means trade took place in public space where it could easily have been witnessed but taxation was made more difficult (cf. RÖSCH 2018a, 215-217). As c. 100 m of the shore have eroded, possible traces have vanished in Reric. This makes it difficult to determine where the exact exchange of goods took place in Reric.

As the author has pointed out in the previous volume, it is problematic to locate early medieval marketplaces or spaces where transactions were carried out. On the one hand, there is limited knowledge about how and where the exchange of goods took place, making it difficult to pinpoint likely locations. On the other hand, there is only very limited archaeological evidence. This is a result of coastal erosion and/or (modern) destructions. In addition, trading space such as beach markets are not expected to have any infrastructure at all and small indications might be overlooked (RÖSCH 2019, 277-281). Minimal places have revealed installations that could be linked to possible beach market situations. For instance, recent excavations at the *Seehandelsplatz* Rostock-Dierkow, Germany, have revealed a large area of up to 3,500 m² at the former shore which was covered with wattle-wood mats. They are interpreted as stabilisation measures for the soggy ground (MESSAL 2019, 29-31). Comparable features are known from Hedeby and Wolin, Poland, for instance while in Kaupang, Norway, rocks were used to stabilise the soil (PILØ 2007; KALMRING 2010; STANISŁAWSKI/FILIPOWIAK 2014). An exception to this is the Frankish *emporium* Dorestad, where dozens of massive platforms of up to 200 m length, following the plots structure on the shore, were constructed in the river bed of the Kromme Rijn (VAN ES/VERWERS 1980; 2009). It is highly likely that actors with commercial interest were engaged in the construction of the installations, which are by far the most extensive infrastructural measures known from a 8th/9th century coastal trading site (RÖSCH 2019, 278).

Despite the sparse archaeological remains, written legislations from the Carolingian realm are strong evidence that the harbour was simultaneously also the market. The same was probably true for places in early medieval England and even Scandinavia, where Carolingian legislation often served as an ideal (RÖSCH 2019, 281-282).

As pointed out previously, the presence of large amounts of specialised craft production is a key indicator for coastal trading places (STEUER 2002b; 2005). The finds reveal that the production was focussed on everyday items such as combs made from bone or antler and glass beads. In some cases luxury items were also produced, as a touchstone from Reric or the deposit of a precious metal smith containing several tools and metal pieces in Rostock-Dierkow indicate (WARNKE 1992/93; WIETRZICHOWSKI 1993, 38). The locally produced goods are interpreted as support for the exchange activities with the hinterland of the *emporium*. In addition to imported objects, mostly consisting of high-status objects such as high-quality ceramics, weapons, glass, jewellery, textiles, wine and mill- and grindstones, exchange of salt and fish, as well as slaves and fur took place. For all of these goods there is only indirect archaeological evidence: salt springs in close proximity to *emporium*, bones of fur-bearing animals and shackles (STEUER 2009, 302; KLEINGÄRTNER 2014, 198-199).

Exchange in the age of Reric was most likely conducted through bartering, even though a small amount of silver coins, four Carolingian dinars, two sceattas and, stemming from the latest phases, four Arabian dirhams, have been found (cf. KLEINGÄRTNER 2014, 80, tab. 4). Since the late 7th century, silver was used as the basis for the European monetary system. In the late Carolingian empire, the dinar was the only weight-regulated coin. At the beginning of the 8th century, in the coastal regions of the North Sea, sceattas were introduced, which were most-likely minted in Frisia and England (STEUER 2009, 294; MÜLLER-WILLE 2011). It is an ongoing debate if sceattas have also been minted in the Danish North-Sea *emporium* Ribe, where large numbers of the so-called Wodan-Monster type were excavated (Fig. 4). By the first half of the 9th century, a “Nordic” type of coin appears in Scandinavia that is clearly distinguishable from continental or English coins. It is not exactly known where they were coined, but mints in Ribe and Hedeby are highly likely (MALMER 2002, 118-122). In addition, silver in the form of ingots and jewellery was also the basis of the monetary system in Scandinavia and the Slavic lands. By the 9th century, Kufic dirhams appear in the Baltic (STEUER 2009, 294). This would indicate that in the age of Reric there is coin-based economy in the West, to some extent, in southern Scandinavia, but not on the southern Baltic coast – Reric vanished just before the coin-based economy became more widespread.

By the end of the 9th century, some decades after the fall of Reric, drastic changes in the market exchange can be recorded in the circumbaltic region. A new system of payment in the form of weight-regulated silver currency was introduced. The centrepiece of the new system were precise and standardised scales and graded sets of weights (cf. KILGER in this volume). These were found in large numbers in all trading places and in other settlements type, as demonstrated by an increasing number of metal detector finds (HILBERG/LEMM 2018). Two types of weights are known: bronze-coated iron spherical/oblate-spheroid weights and bronze cubo-octahedral weights that allowed precise weighing of silver down to 0.35 g. This practice becomes apparent in numerous finds of hacksilver and a large number of silver hoards. It was driven by a large influx of silver dirhams, which weighed almost 3 g and were found in their thousands in the Baltic region. This system made it easier to pay for small, everyday items (STEUER 1997; STEUER *et al.* 2002). Whilst weighing of silver and other goods must have taken place prior to the introduction of this system, it remains presently unknown if and how the weights were standardised.

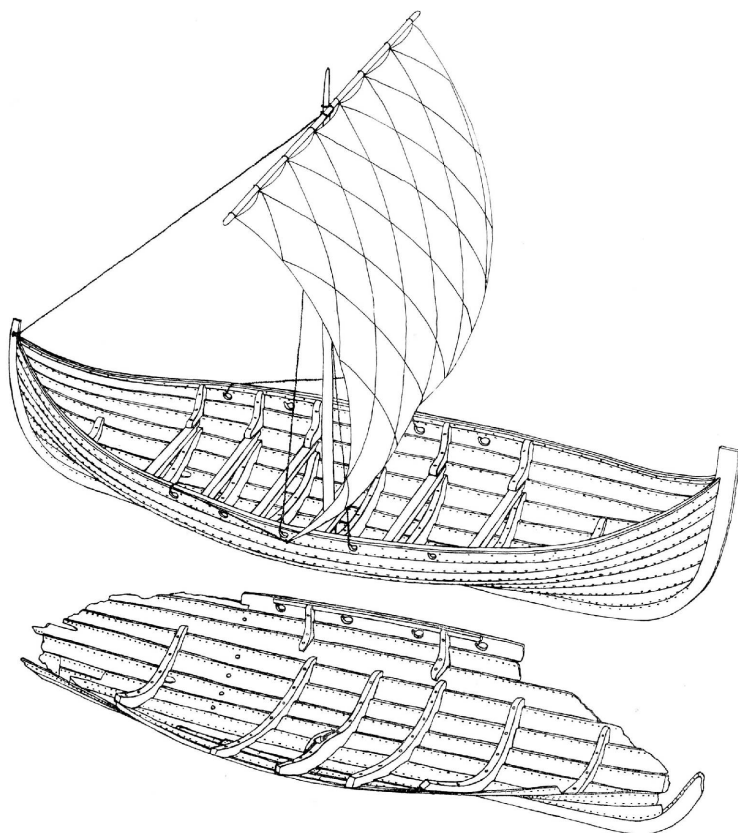
Different opinions exist about the establishment of the system. I. GUSTIN (1997) and H. STEUER (1997, 342-343; 2009, 295) argue that it was neither a king or political entity, nor an organisation of merchants, but a result of intensified communication among a growing number of actors involved in commercial practices and with the Middle East. Others in turn favour the model of a trade system controlled by authorities (KLEINGÄRTNER 2014, 150).

There is strong evidence that the weights of the system were “...perceived as exact, identical and reliable by the people of the time” (GUSTIN 2015, 31). Due to their shape, material and ornamentation they were difficult to counterfeit whilst the ornamentation found on the cubo-octahedral weights gave the impression of exactitude and reliability. The use of the highly standardised weights was therefore also a symbol of trustworthiness. The same is true for measuring equipment with weight-like ornamentation, scales, steelyards and measuring rods. Penannular brooches with faceted end knobs were also seen as trustworthy items (GUSTIN 2015, 31-37; KERSHAW 2019, 131-132).

The standardised weighing equipment as well as the manifold cultural influences suggest that Reric was well-connected in the early medieval Baltic sea region. Reric did not stand alone but formed part of a network of *emporium* that were aligned along the southern and western Baltic coast. Travelers and merchants primarily used ships to travel along the coast. It must be noted that the *emporium* were located at a distance of 30-40 km from each other (KLEINGÄRTNER 2014, 43). This equates to the average daily travel distances of ships commonly used in the 7-9th centuries by Scandinavians and Slavs. The travel durations are known from



▲ Fig. 4. Wodan-Monster type sceatta found in Ribe dating to ca. 710-720 AD. Scale 3:1 (Classical Numismatic Group, Inc.).



▲ Fig. 5. Ralswiek 2 ship-find and reconstruction (HERRMANN 1985, fig. 60).

contemporary travel reports and experiments with ship reconstructions. Probably the most important record in this regard are the travel reports of the Anglo-Saxon nobleman Wulfstan and the Norwegian seafarer Ohthere from the late 9th century. While the former travels under sail, non-stop for seven days and nights from Hedeby to Truso (Janów Pomorski, Poland), which is approximately 385 NM, the latter sailed with night stoppings along the Norwegian coast. Wulfstan's travel speed was calculated as 2.3 kn, while experiments have shown that under favourable wind conditions the speed could increase. A trial voyage with a reconstruction of the Skuldelev 1 ship, a medium-sized Viking trading vessel from 1030 with a capacity of 20-25 metric tons, reached an average speed of 3.5 kn in non-stop travel (ENGLERT/OSSOWSKI 2009; INDRUSZEWSKI *et al.* 2009, 283). The reconstruction of the Slavic ship Ralswiek 2, a 9.0 m x 2.5 m multifunctional vessel from around 977 with an approximate cargo capacity of 2-3 t had an average sailing speed of 2.4 kn during a ten-day run with night stops (GÜLLAND *et al.* 1999). During the age of the named travellers and Reric, *i. e.* the

8th/9th centuries, specialised ship types were not in use in the Baltic (Fig. 5). All known ship finds from this period indicate multi-purpose vessels that were driven by sail and oars and could transport people as well as a certain amount of goods. Their length could reach up to 23 m as the late 9th century Gokstad ship (Norway) demonstrates. Multi-purpose ships between 10-15 m length were found in three out of six boat graves in Reric, where the shape of the former hull could be reconstructed from the position of the rivets. Two others were heavily disturbed and one was of a log boat type. The ships were clinker-built with different fixation and caulking techniques which required the skills of professional shipwrights. By the 10th century specialised cargo carriers like the Skuldelev 1 ship appeared in the Baltic. They were broader and had fixed masts but could no longer be rowed over long distances (CRUMLIN-PEDERSEN 1999; BILL 2003; GERDS 2015, 88-95).

The crew of the ships navigated by sight along the coast, spotting landmarks, but were also capable of astronavigation (solar band celestial) as a result of strong traditions that emphasised oral and corporal transmission of knowledge. It is an ongoing debate whether navigational instruments were in use (for a summary see INDRUSZEWSKI *et al.* 2009, 275-277). Such aids are rarely found and not known before the end of the Early Middle Ages. A miniature wind vane manufactured in the Borre style dating to the 9th/10th century has been found in Menzlin (Mecklenburg-Western Pomerania, Germany), another *emporium* close to the southern Baltic coast (Fig. 6). It is not certain however if it was used for navigation (CHRISTENSEN 1998; LAMM 2002). From 11th century Wolin a wooden disc is known, which has been interpreted as a sundial (STANISŁAWSKI 2001).

Goods for trade were transported on ships in different types of containers and bundles, which are not normally preserved in the archaeological record. An example of a bundle is the famous brass bar find from Hedeby harbour, consisting of 25 cast rods with a rhombic profile and a mean weight of 128 g dating to the 8th/9th century. The bundle probably originates from the Rhineland (SINDBÆK 2001; KALMRING 2010, 438-439).

It is an ongoing debate, whether imported ceramics served as trade goods, containers or were merely belongings of the seafarers and foreigners. In Reric and Hedeby the number of imported wares¹ made up 10 % and 7 % respectively of the total ceramics (by weight) and can theoretically be explained as personal belongings as W. JANSSEN (1989, 135) favours for Hedeby. In Norwegian *emporium* Kaupang almost two thirds of all ceramics were import-

► Fig. 6. Borre style miniature wind vane from Menzlin. Scale 1:2 (KLEINGÄRTNER 2014, pl. 3,25).



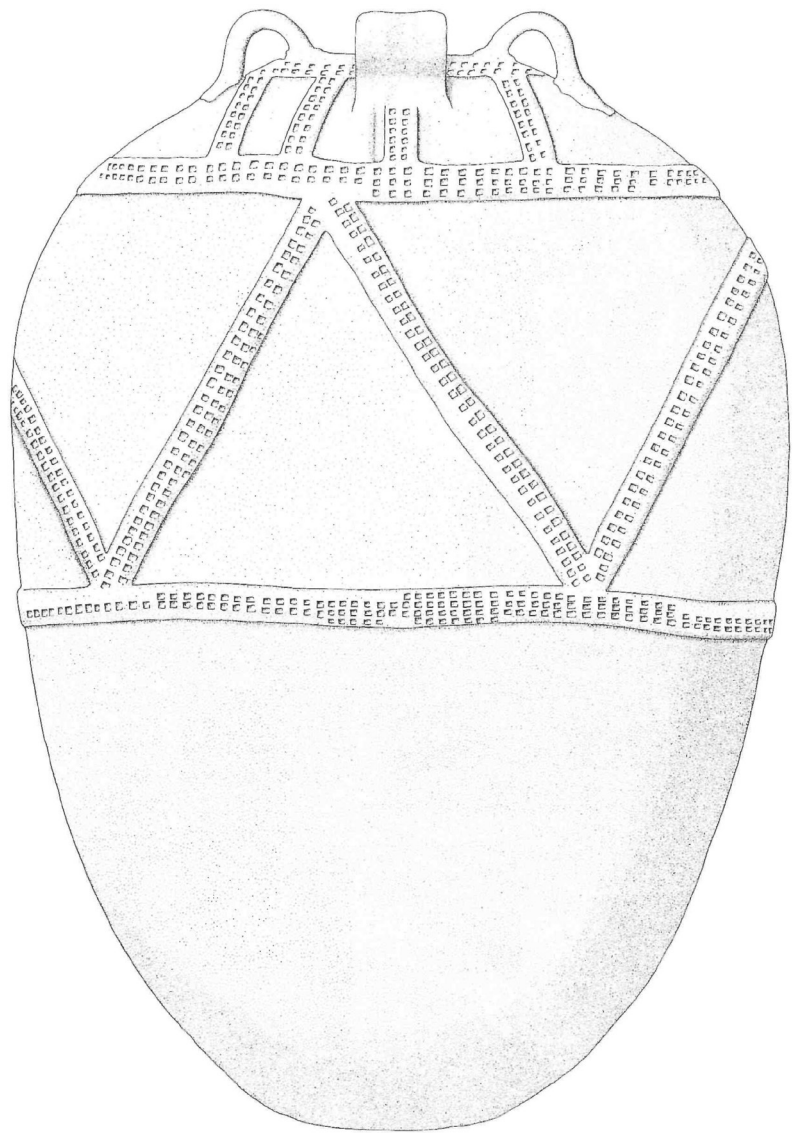
1 Janssen doesn't count the Slavonic type wares among the imported ceramics which would increase the total amount to 12 %. The question, if Slavonic wares were also produced in locally Scandinavia (*i. e.* Baltic ware) has been intensively discussed (ROSLUND 2009; LÜDTKE 2013, 76).

ed and their occurrence explained as trade goods. Not all types of ceramic forms were suited for storage vessels, but the Badorf relief-band amphoras and large ovoid Pingsdorf vessels were certainly built to contain fluids and were used in the transport of wine and oil (Fig. 7). In Hedeby more than 70 % of the imported ceramics were one of these types (STEUER 1987, 134-142; JANSSEN 1989, 128-136; BRORSSON 2010, 95-96). It seems therefore likely, that a certain amount of bulgy ceramics were used as containers to transport, most likely, wine to the Baltic region. Due to their high quality it cannot be ruled out that they were also used as status symbols as E. ROESDAHL (1982) states.

Slavonic pottery was likely used to transport honey and wax from the Slavic lands between Odra and Elbe. The former was known as tribute to the Ottonian kings in the 10th century (KEMPKE 2001, 231, 254). Tar was also produced and exported by the Slavs (BIERMANN *et al.* 2013, *cf.*; BRATHER 2008, 218-220). Whether the finds of roughly 100 shards, most of them with traces of tar, found in the harbour of Hedeby result from the tar trade or are just a witness of ship maintenance is uncertain (LÜDTKE 2013, n. 2).

The use of barrels has been known since the Roman Iron Age (CAPELLE 1981). In the Carolingian Period there are some finds of barrels or barrel parts in trading places such as Dorestad. They date from 685 to 835, were made of oak and originate from the wine-growing area around Mainz, Germany, which makes a transport of wine likely (BOTMAN/VERWERS 1999). Typical finds suggest a secondary use, mainly as wells (CAPELLE 1981). In Reric, out of 72 wells, just one of such kind has been found. This suggests that barrels and the ability to transport larger quantities did not seem to be essential (TUMMUSCHEIT 2011, 108). In contrast, 29 of such barrel wells dating to the 9th and 10th century were excavated in Hedeby (Fig. 8). They were, in most cases, made of non-indigenous conifer wood, particularly fir, which may indicate that they contained imported goods. The barrels reached impressive dimensions up to 2.5 m in height and 0.8 m in diameter with a volume of up to 800 l. Besides wine and other fluids, they were also used to transport different kinds of goods which basically makes them multi-purpose containers. A famous source stems from the Bayeux tapestry, where a huge barrel filled with weapons is brought to a ship by wagon (STEUER 1987, 131-134; WESTPHAL 2006, 37-38).

It remains uncertain to what extent barrels have been used as containers in the early medieval trade. Ship finds with bigger amounts of cargo including barrels are not known before the Late Middle Ages (OSSOWSKI 2014a). What can be carefully stated is, that in the beginning they were limited to the larger trading sites and royal courts (CAPELLE 1981). Throughout the Middle Ages their importance continuously increased, as will be demonstrated later in this article.



In addition to the shore it is important to examine trade by land which is considered in this paragraph. Besides the ships, horses and the use of wagons, hauled by oxen or humans, was an essential means of transport that can be found in the archaeological record. Rich finds from different parts of wagons are known from Hedeby for instance. They comprise parts of disc wheels and spoke wheels as well as wheel hubs and axles. They stem from different kind of wagons that were able to transport loads weighing between 200 kg and 1,000 kg. This is also depicted in the aforementioned scene from the Bayeux tapestry where in addition to the huge barrel, lances and helmets are also transported. The upper construction of a wagon is to date only known from the Oseberg grave, a rich ornamented trough (HAYEN 1983; 1986).

The amount of goods that were transported on land in comparison to the waterways cannot be stated. It has often been argued, that ships were the main means of transportation in the Middle Ages. This is true for heavy or bulky goods or for long

▲ Fig. 7. Badorf relief-band amphora from Hedeby. Scale 1:4 (JANSSEN 1989, pl. 3).



▲ Fig. 8. Barrel found in Hedeby in secondary use as a well (MAIXNER 2010, fig. 8).

distances, but is hard to quantify. Transportation on land included manifold forms besides the wagons (and carts) – pedestrians with panniers, baskets or stretchers, wheel barrows, sledges, pack-animals and travois – which have seldom left traces (BILL/ROESDAHL 2007).

Out of town infrastructure has already been known from the Early Middle Ages. A famous example is the huge Viking-age bridge Ravnings Enge, which spans the flat of the Velje river close to Jelling, Denmark, with a length of 760 m. The oldest bridge of Scandinavia was erected in 980 at the instigation of King Harald Bluetooth. It has a width of more than 5 m and its massive construction compiles 240 yokes, each built of four upright piles in the middle and two slanted piles on the sides, with a distance of 2.4 m. This enabled two wagons to pass each other and also allowed for the movement of large military units. This impressive monument, which was constructed from approximately 300 ha of oak wood, was also a demonstration of power (JØRGENSEN 1997; 1998).

The same is true for the Fossa Carolina (or *fossatum magnum*). It is an artificial channel dug between the Danube and Rhine via the European watershed, with a length of 3 km south of today's city of Nuremberg. Although never finished, the construction site tied up massive resources of King Charlemagne who initialised the project in 793. The amount of wood required alone would have made the felling and shaping of 400 ha oak forest necessary. If it had been finished, the channel, which was designed for shallow draft barges such as the Bremen "Karl" or the Krefeld-Gellep ship find, would have linked the two most important riverine transport zones of Europe (WERTHER 2016; WERTHER *et al.* 2018, 363-366). Even though the Fossa Carolina was never finished, channels in early medieval Europe were of higher importance than often thought. Around 30 are known for the Early Middle Ages with concentrations in southern England, northern France and northern Italy (WERTHER *et al.* 2018, 355-357, fig. 1).

Finally, I will examine Bardowick, a contemporary inland trading place. It is located south of Hamburg at the Ilmenau River, and was first mentioned in 798. It was one of nine trading places on the eastern border of the Carolingian realm mentioned in the Diefenhofer Kapitular from 805. The order prohibited the weapons trade with the Slavs at these nine places, among which were the important towns of the Later Middle Ages Magdeburg, Erfurt and Regensburg. These stretched from Bardowick in the north to Lorch, Austria, in the south (Fig. 9). In its heyday, Bardowick had eight churches and one cathedral and stretched over an area of more than 100 ha, which is more than four times larger than Hedeby. The wic-suffix, imported finds, large numbers of fibulas as well as their own mint highlight its importance as a trading place (GRUNWALD 1997). By the second half of the 12th century,

as Bardowick lost its significance, it became a place rural in character, which allowed for the survival of extraordinary parts of the medieval topography in the soil. Unfortunately archaeologists have not been able to benefit from this circumstance yet. Dozens of excavations have been undertaken up to now, however with the exception of some efforts in the 1980s (HÜBENER 1983; 1984; 1986), a systematic analysis of the findings is still missing.

Nevertheless, the topography of this important trading place can be estimated by excavation reports, remote sensing data and the churches, whose locations are still known in most cases. The settlement is located on a slight elevation in the floodplain between Ilmenau and a moraine in the west. Here the locations of the churches stand out, as they were located on small hills of natural origin as core samples of the subsoil have proven (HÜBENER 1983, 146-147). While finds dating to the 9th and 10th centuries spread over an area of more 130 ha (GRUNWALD 1997, 238, fig. 5), the heart of medieval Bardowick covered an area of approximately 50 ha between Ilmenau in the east and the churches of St. Willehadus, St. Vitus and the cathedral St. Peter and Paul in the west (Fig. 10). Manifold excavations conducted in the past decades have unearthed settlement structures that we are already fairly familiar with. At almost every location, pit houses, some of them containing typical signs of craftwork, and small wells made of barrels/barrel staves, logs or as box constructions, flanked by numerous postholes and other pits, were recorded. Even though a clear stratigraphy has not been published yet, dendrochronological dates prove the introduction of those structures by the 10th century at the latest (ASSENDORP/KUNZE 2010; ASSENDORP 2014; BINNEWIES *et al.* 2018). The historic settlement units even become visible in aerial photographs, where potential pit house locations can be spotted on undeveloped meadows. Still uncertain is the subdivision of the structures. Their arrangement is not yet understood and seems rather random as linear reference structures such as fences, ditches or streets are rare. The same is true for a regular plot layout, which almost certainly must have existed in Bardowick. Based on evidence from other contemporary places, their location can be expected in close proximity to the waterway. An option worth discussing would be an abandoned meander, which, revealed by the digital elevation model, runs past St. Willehadus, ends in front of St. Nikolai, and would provide the sheltered natural conditions favourable for a harbour (Fig. 10). Even though St. Nikolai is not mentioned before 1251 (HÜBENER 1983, 160), the patronage was popular among merchants and seafarers and often located close to bodies of water. The use of this patronage becomes popular from the late 11th century onwards in North-eastern Europe (BLASCHKE 1967). Probably among the oldest churches is St. Willehadus, dedicated to

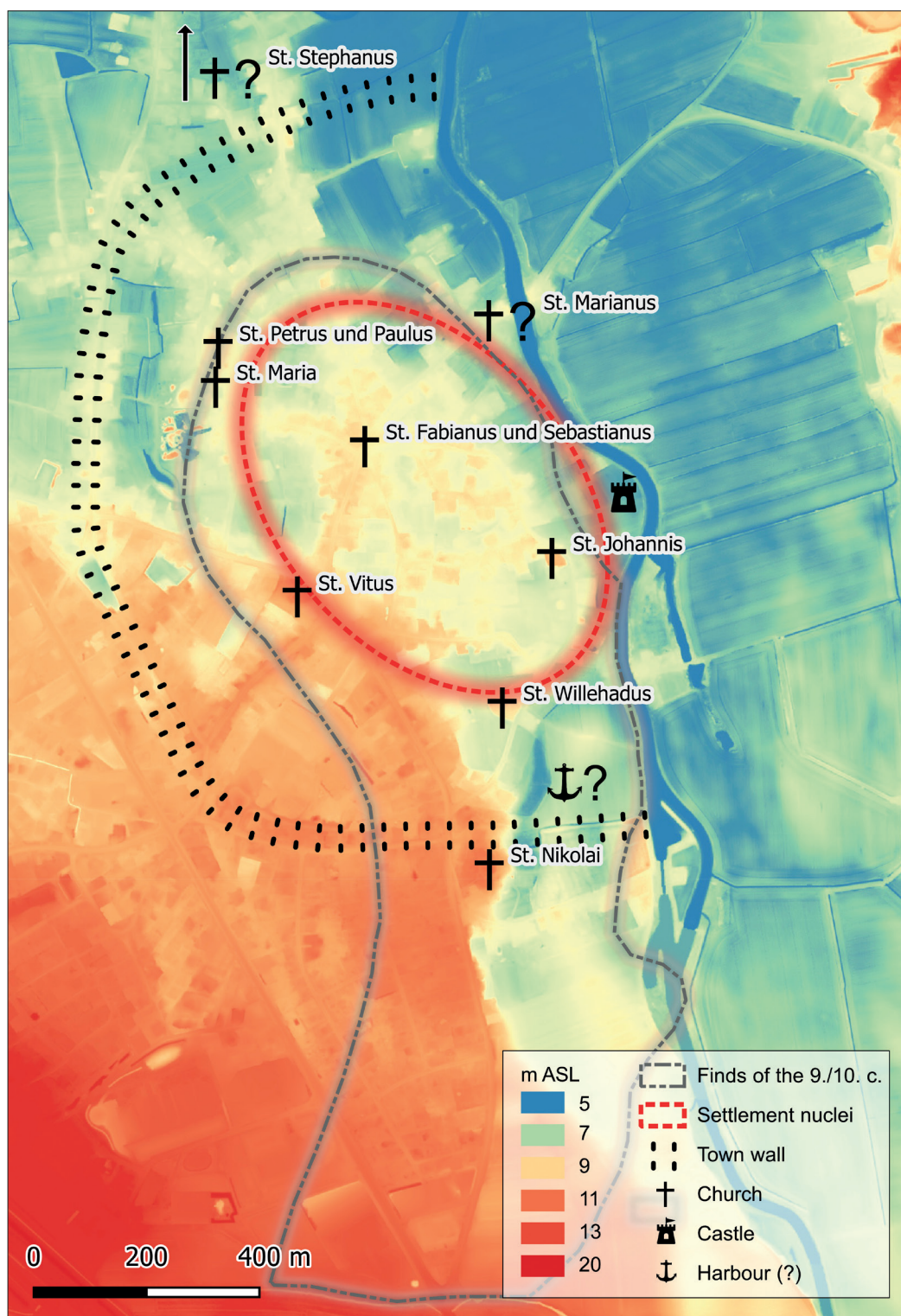


Fig. 9. The reconstructed eastern border of the Carolingian empire (graphics by D. Webner, modified by the author).

the first bishop of Bremen. Whilst not mentioned before 1304 (HÜBENER 1983, 158), many Willehadus consecrations took place in the second half of the 9th century. The age of the churches in Bardowick is an ongoing discussion as none of them is mentioned before the late 12th century. It is highly likely, however, that most of them are considerably older, as indicated by the patronages (DRÖGEREIT 1977; HÜBENER 1983, 150-160). As already touched upon by the author in the last volume (RÖSCH 2019, 276-277), the church played an important role in the organisation of early medieval trade. The existence of manifold parishes was a common characteristic of prospering towns in the Christianised parts of northern Europe. On the

one hand they fulfilled religious needs of different groups (of different origin and/or profession), as is likely for St. Willehadus for people from Bremen (HÜBENER 1983, 158) and discussed for St. Nikolai in Schleswig for Westphalians from Soest (JOHANSEN 1975, 520) or St. Clemens in Lübeck for Scandinavians (RIEGER 2019a, 74-77). A practice that was possible until 1215, the year the IV Lateran council took place and after which the consecration of new churches in places with already existing parishes wasn't possible any more (JAHNKE 2019). On the other hand it also enabled merchants to act as a legal entity, as it is known from Magdeburg in 965/75 (SCHLESINGER 1973, 278-279).

► Fig. 10. The topography of Bardowick in the flood-plains and different areas of activity (graphics by the author, based on: *Auszug aus den Geodaten des Landesamtes für Geoinformation und Landesvermessung Niedersachsen*, © 2019; *Wall and find distribution based on GRUNWALD 1997, fig. 1, 5*).



The case of Bardowick demonstrates that the churches played an important part in the technology of early medieval trade in Christian Europe, while many other topographical elements could be found in trading places all over northern Europe. A travelling merchant would have come across familiar technologies almost everywhere despite regional variations depending on religious, political or natural circumstances.

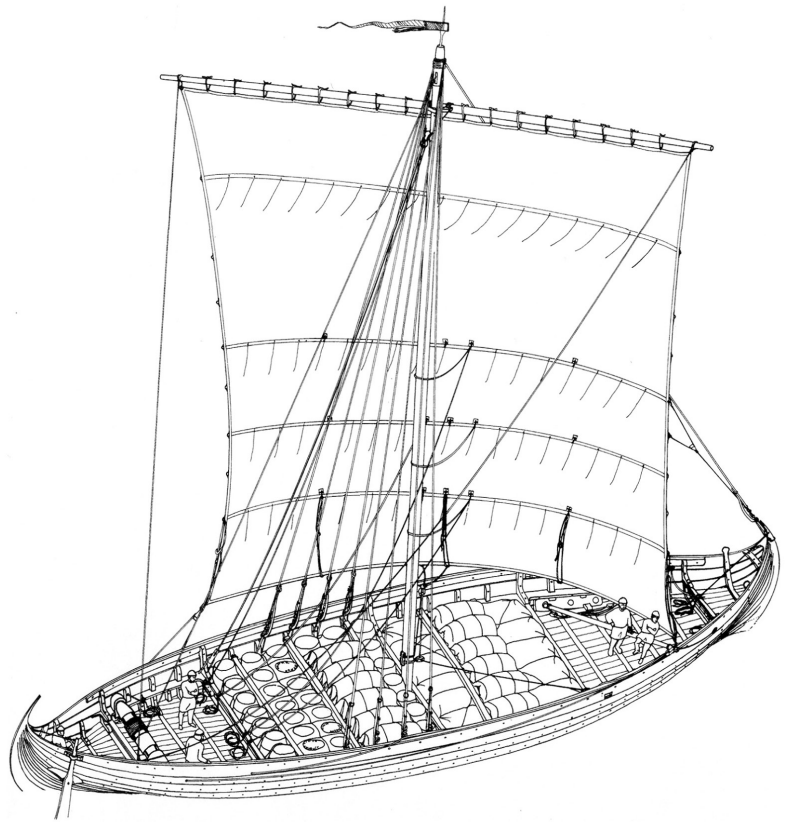
High medieval maritime trade: The ports

In the early 1170s a miracle is said to have occurred in the prospering Danish port of Schleswig: “A wealthy man in Denmark, citizen of the town of Schleswig, built a large ship at great expense. And the king of the country decided to join company and take part in the profits. And after he had made good half of the costs, he owned a corresponding

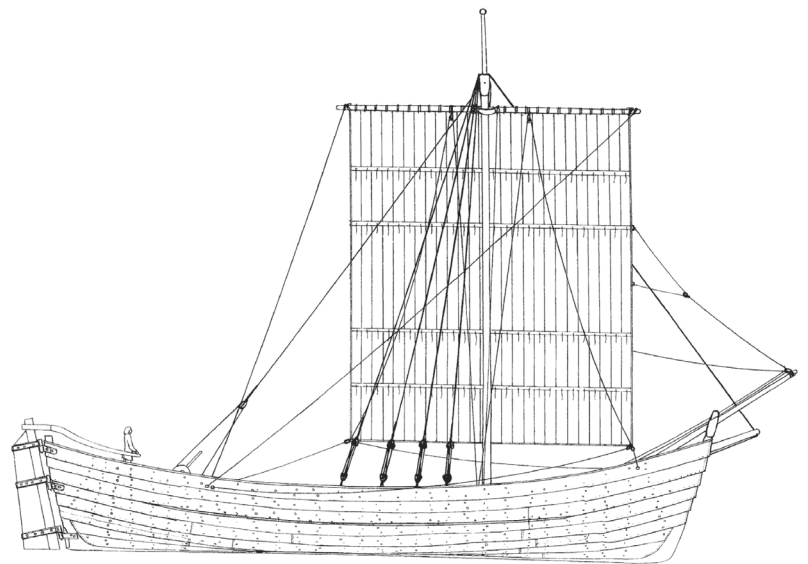
part of the ship. When the ship was built and ready to be launched, it could not be moved because of the huge size of its [hull], and even with many people pushing it, with cushions laid underneath, and with ropes being pulled, the effort was in vain. Many people thought that the ship would have to be broken up. And to avoid wasting his efforts and expenses, the worried owner of the ship considered requesting the support of the new martyr Thomas. Quietly, he said: 'Move this machine into the deep, Martyr, and I promise you 100 pounds of wax from each of its trading voyages.' Gently moved by hands, and with many fewer people pushing than before, the ship descended into the waves just as if it was gliding over something slippery. And the obligation of this vow lasts to the present day" (ENGLERT 2015, 13).

The legend which is dedicated to Thomas Becket, Archbishop of Canterbury, who was murdered in 1170, is of interest in several cases regarding technologies of high medieval trade (ENGLERT 2015, 14). On the one hand we learn about two actors engaged in trade-related activities. An enterprising citizen of Schleswig with capital investment, who we can call a merchant, and the king of Denmark. The king, in this instance Valdemar I, co-finances the construction of the ship, indicating joint ownership existed. On the other hand, we learn that Schleswig was a market and port with a shipyard capable of building large ships. This suggests a skilled work force, knowledge and technologies were present. We also learn about the ship itself, which is described as *navis magna*, i. e. extraordinarily large. In 12th century Denmark, the construction of large cargo vessels was at a crossroads. There were bulgy vessels built in Nordic tradition, as the so-called *Knarr*, but also the first appearances of seagoing flat-bottomed vessels, commonly known as cog².

In the late 10th century Nordic ship building developed from multi-purpose vessels towards more specialised crafts. There were long and narrow war ships with a beam to length ratio of up to 1:10 that were fast and designed to carry troops. Then there were the bulgy cargo vessels with a ratio of 1:3.1 whose hulls were stabilised by cross bracings. The cargo carriers could not be rowed anymore and, due to their massive hull and draughts of up to 1.5 m, beaching was no longer possible. While the average vessels had cargo capacities around 20 t, some ships could transport loads of up to 60 t in their open hull. Such extraordinarily large cargo vessels are known since the beginning of the 11th century (Fig. 11). From the late 12th century ships with a capacity of 120 t are known, the so-called "Big Ship" from Bergen, Norway. This was probably the maximum, the shell-first technique of Nordic tradition



▲ Fig. 11. Reconstruction of Hedeby wreck 3. With a capacity of ca. 60 t this ship – built around 1025 – belongs to the largest cargo vessels of that time (drawing by Wiking Museum Haithabu).

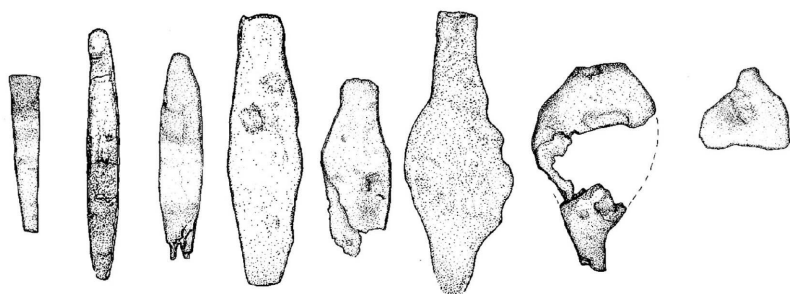


▲ Fig. 12. Reconstruction of the Kollerup cog from ca. 1150 with a sternpost rudder and an improved rig (ENGLERT 2015, fig. 4,11).

was able to achieve (CRUMLIN-PEDERSEN 1999; ENGLERT 2015).

The *navis magna* built in Schleswig, has often been linked to the introduction of the cog in Denmark (CRUMLIN-PEDERSEN 2000, 120; RADTKE 2002, 47; BILL/HOCKER 2004). The first appearance of such ships was the find from Kollerup, an early stage cog built around 1150 with a capacity of 42 t, and the Kolding cog with 70 t capacity built in 1189 (Fig. 12). Cogs were bulbous vessels which

2 The term "cog" is a historic one and its use for archaeological ship finds as well as historic images on seals *etc.* has been much debated as it is probably linked to a ship size rather than a type of construction (ENGLERT 2015, 69-70; ZWICK 2012, 290 n. 2).



▲ Fig. 13. Variety of *sintels* found in Hollingstedt, Schleswig's North Sea harbour (SIEGLOFF 2012, fig. 5).

could reach a beam-length ratio lower than 1:3 m. Their bottom was flat and built by flush-laid planks, while the sides were made by the clinker technique. Contrary to the Nordic-type vessels, they had straight stem and stern posts and stern-mounted rudders. Another characteristic was the use of *sintels* (Fig. 13), metal staples, which secured the caulking (ELLMERS 1994; CRUMLIN-PEDERSEN 2000; HOCKER/DALY 2006). The biggest advantage of the cog was a more economical construction, which results primarily from the fact that sawn instead of split planks were used. This allowed either smaller logs or sawn wider planks to be used to save on fixations and caulking material. Furthermore, to a certain extent also unskilled workers could be used (ELLMERS 1994; JAHNKE 2008, 177). In the following centuries – J. BILL (2003) characterises this period as a phase of mass construction in northern European shipbuilding – the cog was increasingly developed and enlarged (capacities up to 200 t are known), while the Nordic ship type almost vanished (ENGLERT 2015, 277-285).

Shipbuilding in the Schleswig area is proven by dendrochronological data. At least five out of 16 Danish medieval cargo vessels, among them also the mentioned cogs, are of southern Jutland provenance (DALY 2015). Additionally, finds of *sintels* have been unearthed in larger quantities in the town. Some of them dating to the late 11th or early 12th century are the oldest known finds in the Baltic. *Sintels* are often related to the construction of cogs (VLIERMAN 1996; SIEGLOFF 2012, 188-200). Without relating features they could just as well stem from maintenance activities on other ship types as the Karschau wreck in the Schlei demonstrates, or hull parts in secondary use (ZWICK 2012, 289; ENGLERT/KÜHN 2015, 202, 228). However, dendrochronological data and finds indicate, that the legend contains elements, that could actually have occurred. It is therefore highly likely that cogs were constructed in Schleswig which makes the town a centre of technological innovation.

As the ships developed so did the practice of seafaring. The legend of St. Thomas already pointed towards multiple ship ownership. This practice can be retraced to the first half of the 11th century as three rune stones from Aarhus, Sporup (both Denmark) and Västra Strö (Scania, Sweden) bear witness (DÜWEL 1987, 327). Merchant seafaring in the high middle ages was to a certain extent

conducted in co-operation. While such a practice is known as early as the 7th century (ELLMERS 1984, 17), later (Scandinavian) sources differentiate between skipper, who could be the owner, one of the owners or a representative of the owner, and ship-companions. The companion paid the skipper for a share of the cargo space, but was also a seaman, as he had ship operation duties and, if necessary, had to defend the vessel. Such practice is probably depicted on the earliest town seal of Lübeck (Fig. 14).

From the 13th century onwards a growing separation of the commercial and nautical functions on board can be recorded. On the ships three different actors are recognized: ship owner/captain, crew and cargo owner. This is described for the first time in the Rôles d'Oléron from 1224, the first codified maritime law (MÜLLER-BOYSEN 1990, 43, 62-63, 136-145; DEGGIM 1999; JAHNKE 2008; ENGLERT 2015, 42-45). King Valdemar's Itinerary (Valdemar II. ruled from 1202-1241), the earliest sea itinerary for the Baltic Sea, also dates to this period. The document describes a route along the coastline of Sweden and Finland, connecting the island of Utlängan (close to today's Karlskrona, Sweden) with Tallinn (Estonia) which became Danish territory in 1219. The itinerary was more a basis for calculation rather than a practical sailing guide, but doubtlessly stemmed from observations made by seafarers. That the descriptions are linked to an actual route has been proven by an experimental sailing trip (ZWICK 2017, 44-69).

Besides the specialised types of ships introduced in northern Europe by the 11th and 12th centuries, innovation also becomes apparent in a new type of urban settlement topography. Most of the early medieval trading places have vanished or were shifted, while only a few experienced a resurgence – Ribe for instance. Schleswig was among the new founded towns which took place unusually late in the 1050s or 1060s after Hedeby's demise (MÜLLER *et al.* 2014; MÜLLER 2016; HILBERG 2016; RÖSCH 2018a, 277-281).

Schleswig is clearly distinct from its predecessor. A bag-shaped peninsula of 10-12 ha located on the northern shore on the Schlei was chosen as location (Fig. 15). Within two to three decades the whole peninsula as well as parts of the neighbouring peninsula Holm were completely developed. The new town was shaped by a modern harbour and waterfront, the physical manifestation of power and Christian belief (RADTKE 2009).

In the last volume the author has pointed out that the commercial waterfront design of early Schleswig can be seen as a blueprint for many ports in northern Europe (RÖSCH 2019, 282-283). Extensive excavations have revealed large parts of the early waterfront, which have survived extraordinarily well in waterlogged conditions (VOGEL 1983) and could finally be analysed in detail (RÖSCH 2018a; 2018b). The core element of the waterfront were

large dam-like platforms emerging in several steps into the shallow water (Fig. 15). The platforms succeeded a regular plot layout on the shore and were developed with houses, pens, ovens and other installations. These were built and maintained by different groups of actors involved in long-distance trade (Fig. 16). This was illustrated by the following findings:

1. The platforms were erected on the southern shore of the peninsula – the spot where the cargo ships from the Baltic Sea arrived, as well as barges from the southern shore of the Schlei, loaded with goods and carts from the North Sea harbour Hollingstedt.
2. All platforms were of the same design, but built in different years using wooden planks or small logs distinct in quality and shape.
3. A competition which became obvious by the observation that the dams were frequently extended over the heads of their neighbours.
4. The individual development on the platforms.
5. Depending on stage and location of the platform, cargo ships of higher capacities had the ability to moor at the heads.
6. A high amount of imported ware which makes more than $\frac{1}{3}$ of the total, was found. It is composed of Rhinish and Slavonic pottery, the last exceeding the number in the town centre by four times.

The platforms were suited to the needs of the 11th/12th centuries long-distance trader. They provided a locational advantage, due to direct access to the water, space for housing, goods and the hosting of foreign merchants, a practice which is known in Schleswig from the mid-12th century at the latest (SlStR I § 31), and the possibility to directly load and unload cargo vessels. They could be regarded as private space and, when foreigners were hosted, as semi-public space. Comparable installations in different variations have been revealed at many contemporary waterfronts at ports in England, the Netherlands, Germany, Norway and Poland (RÖSCH 2018a, 106-130, 239-255, fig. 21).

The platforms were flanked by a network of narrow corduroy streets, which linked the waterfront with the town centre while causeways running parallel to the shore provided access to plots and platforms (Fig. 16). As the platforms grew into the Schlei, so did the streets, whose front ends might have been used to unload carts from the barges. Like the platforms, most streets were built and maintained individually by the residents with sections differing in material and quality (RÖSCH 2018a, 92-106, 237-239), as could be observed in the archaeological record.

The centrepiece of the commercial activities was a huge undeveloped platform, which functioned as space for a so-called harbour market. This type of market developed from the beach markets and trading shores of the early middle ages. Their advantage

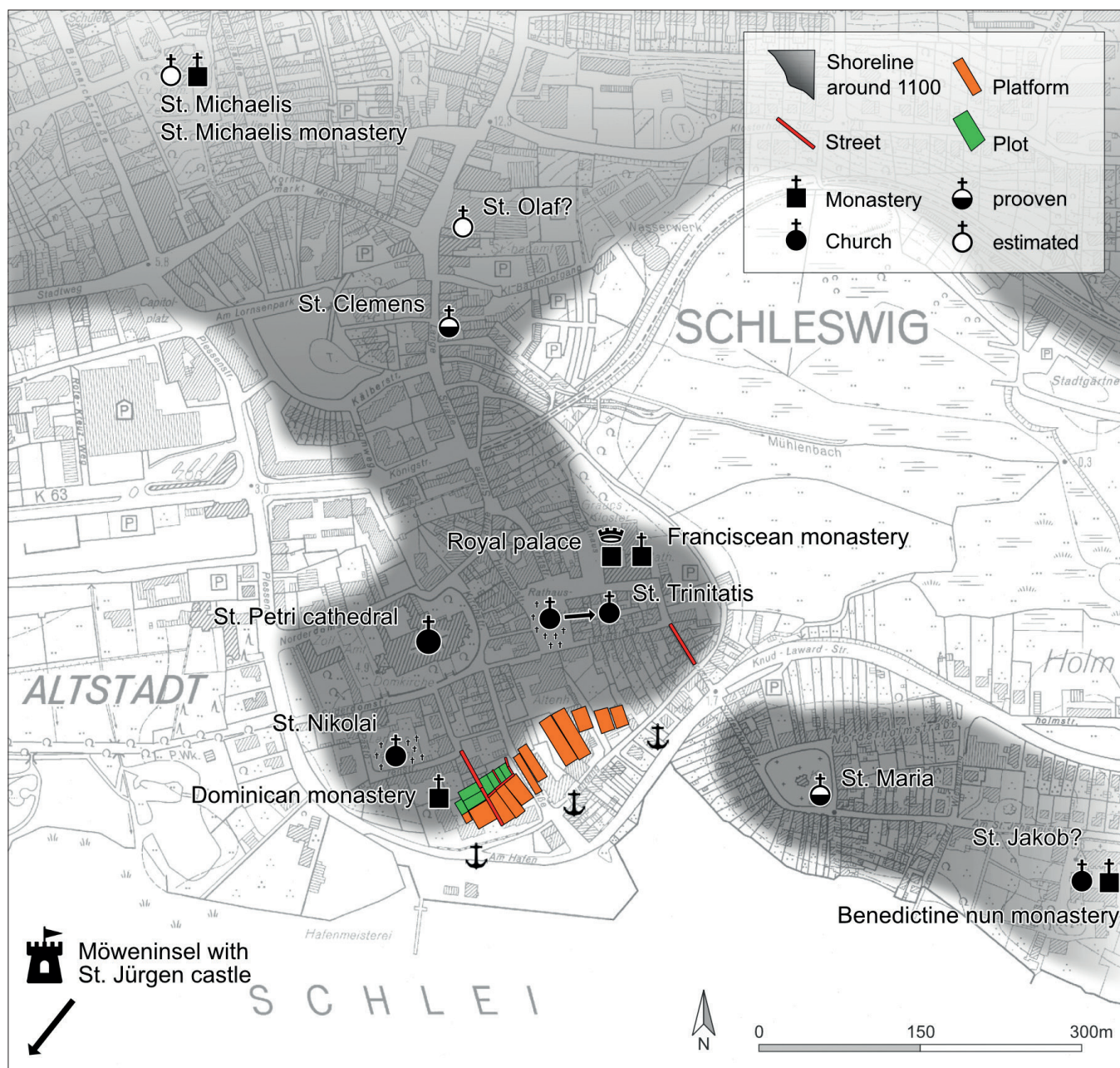


◀ Fig. 14. The Lübeck seal of 1256 depicting a skipper and ship companion making an oath (EWE 1972).

was the connection to a waterway, the infrastructure in which it was embedded as well as a controlled situation (Fig. 16). The public open space enabled the eye-witnessing of transactions by authorities and especially third-parties which played an important role in medieval jurisdiction (RÖSCH 2018a, 255-260; 2019). To date, harbour markets also have been identified in Hedeby, Dorestad, London and probably Lübeck, but they are likely to have existed at other places too as their identification by archaeological methods is rather complicated (RÖSCH 2019). Moreover early medieval written sources indicate that harbours and markets are strongly linked (MIDDLETON 2005).

Essentially the high-medieval long-distance trader was subject to a broad variety of laws. This fragmentation has often been understood as restraint for commercial activities. But it could also have borne advantages in regard to communication, conflict de-escalation and possibilities of choice and design as A. CORDES and P. HÖHN (2018) pointed out. The basis of the legal protection of foreigners in the medieval trading hubs were privileges, which were granted to different groups. In early Schleswig King Canute the Holy (1080-1086) even legally equated all foreigners in 1084/86 with the local population (MÜLLER-BOYSEN 1990, 113), while in 1134/36 Colognians appear as one of the first privileged groups (RADTKE 1995, 61). Besides the privileges, protection was also offered by ship communities or guilds, allowing merchants to support each other in foreign places (MÜLLER-BOYSEN 1990, 62-78, 136-137; JAHNKE 2008; RÖSCH 2018a, 224-226). The identification of the groups by archaeological sources is almost impossible though, as they describe a legal status or a form of self-organisation.

Security and control in Schleswig were provided by the Danish king and his local representatives, the jarls of Schleswig (later dukes). Their power manifested itself in the regular waterfront design, which goes back to a royal initiative or at least permission (RÖSCH 2018a, 243). By around 1200 we also have written evidence from the



▲ Fig. 15. The topography of early Schleswig based on archaeological, architectural and written sources (graphics by the author, based on KARTE LVERM SH DTK 5).

oldest municipal law, containing several regulations of how to build and maintain bridges (= platforms) and streets (SIStR I § 41, § 86). The king himself had a palatinate in the eastern part of the peninsula (Fig. 15). The building is assumed to have existed as early as the 11th century, because several visits by the king are known. Archaeological proof in the form of the foundations of a hall building and a tower date not before the second half of the 12th century (RADTKE 1977; MÜLLER 2014, 360). Four castles situated along the Schlei played an important role not only in the security of the town but also in the control of the trade. One, the *Oldenburg* (old castle), a huge tower of 24 m in diameter, was located at the mouth of the Schlei. Here all ships heading towards Schleswig had to pay a tax of 12 pennies (RADTKE 1981a). Two fortifications at both

sides of the narrowest part of the Schlei (which can be at Missunde or Stexwig) are as yet unidentified. The mid-13th century Knytlinga Saga mentions a massive iron chain which was installed under jarl Knud Laward in the 1120s and was able to block the access to the inner Schlei (NAKOINZ 2005, n. 21). A well-known archetype of such a practice is known from Constantinople, where the main byzantine harbour, the Golden Horn, could be blocked by a chain in the early 8th century at the latest (SCHREINER 2015). The fourth castle was the St. Jürgensburg located on an island in front of the harbour (Fig. 15). The castle which was erected in the 1120/30s at the latest, was the seat of the jarls and dukes of Schleswig. From its location the actions taking place at the waterfront could be easily observed, while the castle itself demonstrated to incoming foreigners and



inhabitants, the power of the town lords. Ships leaving the harbour had to pay a tax of six pennies at the St. Jürgensburg. Several minor archaeological surveys have revealed an early fortification phase, a wall made of wood and sods which was followed by a brick construction. In addition several wooden bridges running from the island to the town are known (RÖSCH *et al.* 2014). Last but not least a signal-fire system might have existed in the Schlei region (LEMM 2016). It can be stated that the defence and control systems of Schleswig were strongly geared towards the maritime environment. Both, friends and foes, were expected from the sea side in particular.

Trade was also controlled by local coinage of the Danish kings minted in Schleswig since the 1070s. As

so-called *landsdelsmønter* (English: part-of-the-country coins) the use of the coins was limited to the town and southern Jutland. The system behind the currency was the *renovatio monetarum*, where new coins were circulated every five years (Fig. 17). On the one hand, the obligatory local currency guaranteed a uniform means of payment in the town and on the other hand enabled the crown to generate considerable income (MOESGAARD *et al.* 2016). Parallel to the local coinage, the weight-based currency system was at least to some extent still in use until around 1100. This is indicated by the findings of a range of weights and scales, the largest number stemming from the marketplace (STEUER 1997; RÖSCH 2018a, 255-260).

The manifestation of power and the installation of manifold security systems stands in contrast to

▲ Fig. 16. Schleswig, Plessenstraße 83/3 excavation (dashed-and-dotted lines). The topography and development of the early waterfront. Private space is highlighted in dark grey, public space in light grey (graphics by the author).



▲ Fig. 17. *Denier type Dbg. 1304, struck presumably in Schleswig under the reign of Svend Estridsen (1047-1074) and circulated locally (MOESGAARD et al. 2016, fig. 12).*

the early medieval *emporia* where buildings linked to authorities are rare and fortifications not known at all – at least not before the 10th century, when the ramparts in Birka and Hedeby were built (CALLMER 2007, 243; KLEINGÄRTNER 2014, 144). Nevertheless, a town fortification surrounding the peninsula, did not exist in Schleswig before the late 12th century too (RÖSCH 2018a, 186-189).

As in Bardowick we also find many churches in Schleswig. By the end of the 12th century at the latest, seven churches and a monastery are known. Already from the 1080s two churches, indicated by cemeteries with dendrochronologically dated coffins, are archaeologically known (Fig. 15). The early churches were probably made from wood. One was erected at the waterfront and, not surprisingly, dedicated to St. Nicholas. The other stood in the centre of the old town, was dedicated to St. Trinitatis and discussed as the first cathedral. By the 12th century the church was re-built in stone, while the newly erected St. Peter took over the role as episcopal church (VOGEL 1971; LÜDTKE 1997). In the northern edge of the old town St. Clemens, close to the silted up Holmer Noor, was located, while St. Maria still exists in the fishermen's suburb on the Holm. The location of St. Olaf and St. Jakob is uncertain (MÜLLER 2014; AUGE/HILLEBRAND 2019, 537-670). This high number of churches probably goes back to different groups/associations. Merchants from Westphalia had strong ties to the town. For instance the oldest municipal law, codified around 1200, goes back to the one of Soest, and Westphalians might have been organised in the parish of St. Nikolai (JOHANSEN 1975; RADTKE 1981b). St. Clemens and St. Olaf became popular in 11th and 12th century Scandinavia and therefore are likely to be among the earliest churches in Schleswig too. St. Clemens points to the initiatives of Danish elites (nobleman or the king) who wanted to further mercantile activities under their control (RIEGER 2019a, 74-76). When abroad in non-Latin-Christian lands, Christian merchants took a priest with them. After trade connections became more institutionalised, it was possible to erect their own church and have a temporary priest installed there. Solely in exceptional cases a church could be built by foreign merchants when they stayed in a catholic town (JAHNKE 2019).

The case study Schleswig has given an insight into an 11/12th century maritime trading hub. The complex and differentiated topography is clearly distinct from the early medieval coastal trading sites like Reric. Even though a regular and planned layout can be stated for both places, the design of the waterfront, compiled of water-related properties and harbour installations, a marketplace and churches, dedicated to patronages of seafarers and traders, can be understood as a reflection of an increased volume of trade and more professional actors. This also became obvious in the emergence

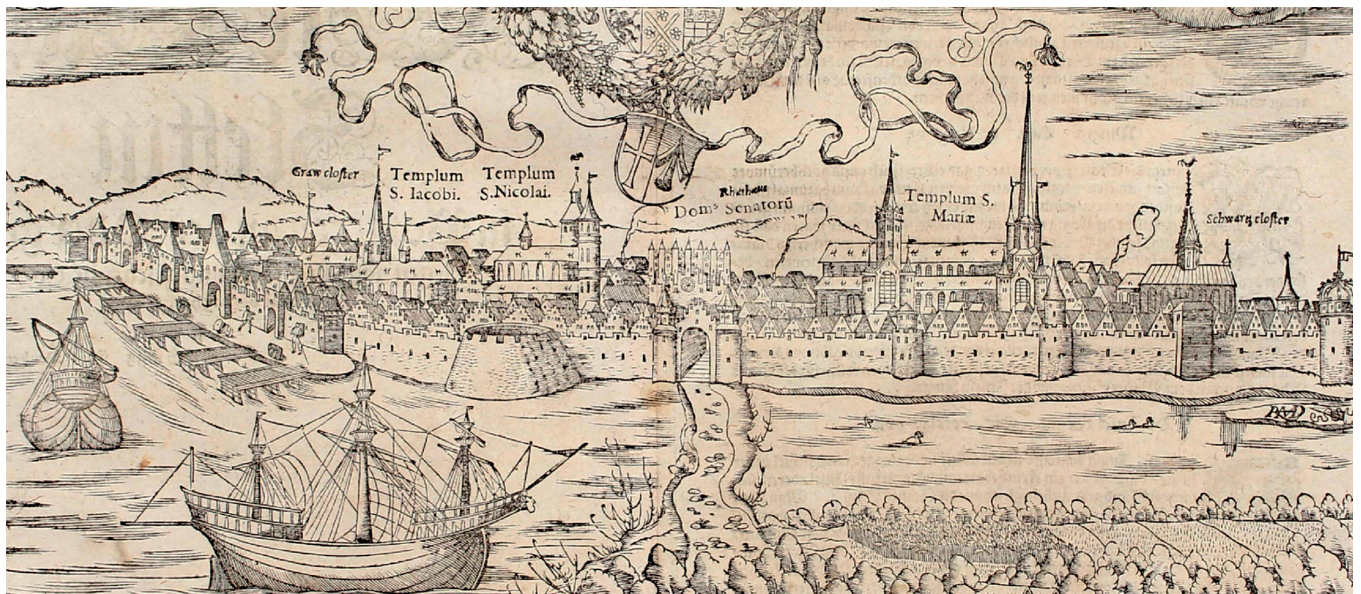
of the large cargo vessels. A manifold system of defence works and control mechanisms guaranteed security and reliability and generated a substantial income to king and town.

The later Middle Ages – a short glance at some aspects of the further development of the technology and topography of trade

From the 13th and especially the 14th century onwards the written and visual sources of northern Europe become more and more precise about technologies of trade, actors and their networks. The late medieval and early modern economic history can be regarded as well studied compared to earlier periods (KYPTA et al. 2019, 3-4). The analysis of correspondence of Hansa merchants for instance, have revealed detailed information about pan European trade networks, naming single actors, places and trading processes, types and amounts of goods, diplomatic and plotting actions and many more (cf. BURKHARDT 2012; EWERT/SUNDER 2012).

The increasing number and quality of sources along with well-preserved built environments led to detailed studies in the topography of the late medieval seaside town by archaeologists, historians and geographers (Fig. 18). In particular, towns of the Hanseatic League on the southern Baltic coast show similar features and had the same municipal law. In the late medieval seaside town, the long-distance trade has moved away from the harbour markets to the merchants' houses whose spacious hall houses (the so-called *Dielenhäuser*) became the semi-public spaces of trade relations. The marketplace has shifted to the centre of the town and now held a primary function to supply the local population. Furthermore, the town was now secured by a fortification which completely surrounded it. In front of the seaside walls, the harbour was located consisting of a more or less open space used for loading and unloading the vessels, mooring installations as jetties, piers or quays and cranes. The goods were brought into the town through several gates via so-called *Hafenstegstraßen* (harbour jetty streets) on whose sides the *Dielenhäuser* were arranged gable-end onto street forming a continuous front. In contrast to the earlier trading places, the churches were lower in numbers but of impressive architecture. Also, monasteries of mendicant orders had found their way into town. Furthermore, town halls with richly decorated fronts symbolising power and status of the new rulers of the town, the burghers represented by the town council (HOFFMANN/LUBOWITZ 1995; PIEKALSKI 2001; HAMMEL-KIESOW 2005; MÜLLER 2010; 2011; RÖSCH 2019, 286-289).

These topographical items, most of them still in existence, shape our image and understanding of the medieval seaside town to the present. That they became wide spread demonstrates the success



▲ Fig. 18. View of Stralsund from 1592 by Sebastian Münster. Many typical topographical elements of the late medieval Hansa town are displayed: a harbour with jetties and open space, a surrounding wall with many gates at the harbour, a skyline dominated by churches, monastic buildings of mendicant orders and the gable of a town hall (MÖLLER 2005, fig. 1).

of a seaborne trade related topography. In this regard the design of 11th/12th century Schleswig can be understood as an intermediate stage in the development. By the first half of the 13th century several measures are recorded in the town, that point towards an adoption of this new topography in Schleswig too (VOGEL 1999; RÖSCH 2018a, 270-275).

The latest results from the extensive *Gründungsviertel* (founding quarter) excavations conducted from 2009 to 2017 in the town of Lübeck, called Queen of the Hanseatic League, have virtually delivered a blueprint for such a development. The excavations revealed that settlement activities in Lübeck are considerably older than the historical records – the famous “double foundation” by the count of Holstein in 1143 and Henry the Lion, duke of Saxonia in 1158 – indicate. Probably as early as around 1100 a settlement was erected at the Trave river, on a peninsula consisting of shore parallel wattle-wood houses in a linear arrangement, a large open space interpreted as marketplace, a (surrounding?) ditch and a potential church dedicated to St. Clemens – a topography of trade familiar to us by now. By 1143, the date of the first foundation, the topography massively changed. The houses at the shore vanished and plots were set up and developed on both sides of a street running from the town centre rectangular to the shore – the predecessor of a later *Hafenstegstraße*. After Henry the Lion took over, a unitary structuring of the plots could be recorded, which was highly suited to mercantile needs. The plots compiled a large, multi-storied front building with cellar, followed by a small court with adjoining buildings and a building at the back containing wells and cesspits. Many of the front buildings were constructed using the sill beam technique with standardised timbers. While the market space at the shore still existed until the end of the 12th century, a central market in the cen-

tre of Lübeck, the *Hauptmarkt* (main market), can be recorded from 1158/59. By 1180, shore and harbour have been separated from the settlement by the first town wall (RIEGER/JAHNKE 2018; RIEGER 2019a; 2019b).

A greater number of interesting finds have been made in the earliest layers of the *Gründungsviertel*: ampulla shaped cast tin objects, consisting of a round coin-like centre of just 1 cm in diameter with different motifs and a hoop (Fig. 19). The function of the objects is still uncertain, but the hoop could have served to attach the item to something by a cord. D. RIEGER (2019a, 67) discusses the items as potential early seals, which would be an outstanding early proof of institutionalised quality control. Seals and especially cloth seals appear in almost every European commercial centre by the 13th century. They were introduced to guarantee the quality of products by officials which now could be bought unseen. The seals, mostly made of lead, were in use until the 18th century reaching its peak in the Early Modern Period (EGAN 1994; HITTINGER 2008).



◀ Fig. 19. Tin objects of unknown purpose found in Lübeck. Have they functioned as early seals? (RIEGER 2019, fig. 20).

► Fig. 20. Bundle of iron bars (Ossowski 2014, fig. 7).

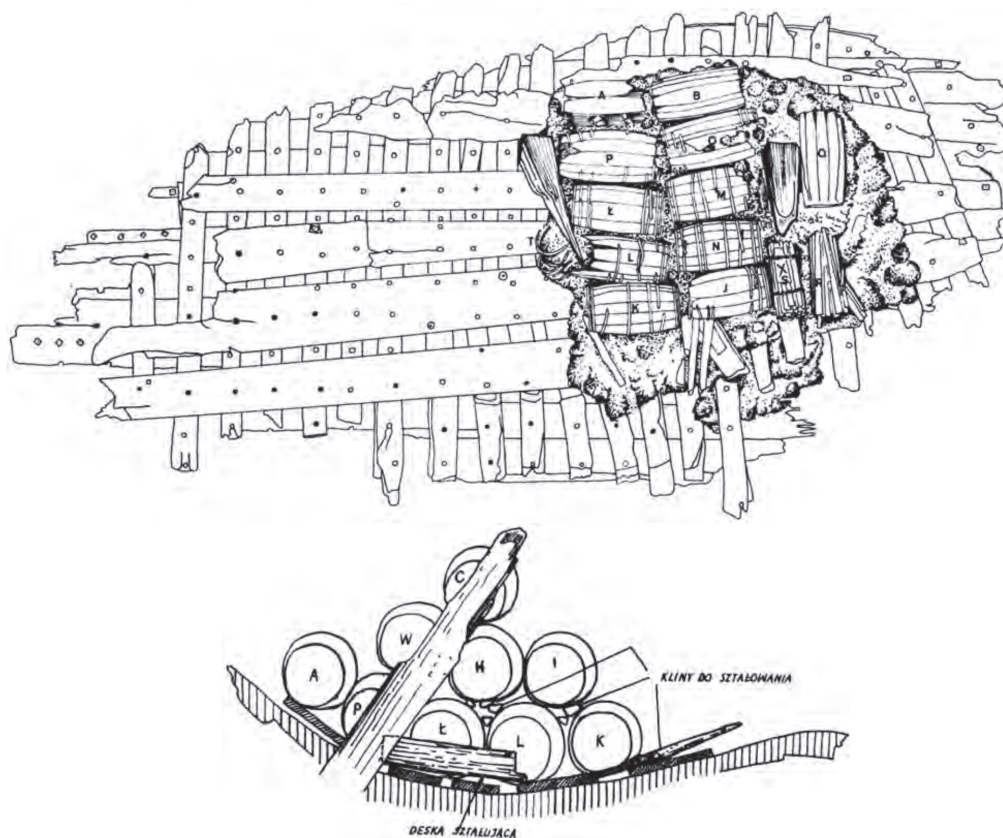


An outstanding archaeological highlight in regard to the technology of late medieval trade is the so-called Copper Ship, a ship which sunk around 1408 in the Bay of Gdansk (Poland). Much of its cargo has survived, compiling of copper ingots, bundles of iron ingots (Fig. 20), barrels filled with iron lumps, wood tar and potash as well as wooden planks and wainscots just to mention the highlights. Many goods were signed by merchants' marks (also known as house marks or personal mark) – on the barrels alone, 28 different marks could be identified (Fig. 21). It is still debated if merchants' marks were a means of identifying goods, signified quantities or batches of goods, have been related to quality control, denoted ownership or recognised those, who were to receive them (Ossowski 2014b). While such marks are known since the Early Middle Ages and even earlier, they were increasingly in use since

the late 14th century, when town officials ordered containers to be signed by maker's marks (HOMMEYER 1870; KOCH 1930; FALK 2003).

As the number of written sources in general rapidly increased in the Late Middle Ages, so too did the written communication in terms of trade in particular. While texts on parchment or paper are seldom found by archaeologists, styli, and in some cases also the associated wax boards, are known in greater numbers. Styli were made of metal or bone and primarily used to engrave wax boards. They appear in the Early Middle Ages in the clerical environment and increase in numbers from the 12th century onwards indicating a growing literacy. Their use in trade contexts is documented since the 10th century (KRÜGER 2002, 1-85). Additionally, two regional types of documents are known which also have survived in the soil: the western Russian birch bark letters and the Bryggen runic inscriptions. More than a thousand, most of them have been excavated in the medieval town of Novgorod, are known of the first type. They are mainly written in Old Novgorod dialect, but also other languages have been identified, and date from the 11th to 15th century with peaks in the 12th and 14th/15th century. The letters are of personal as well as business character containing information to trade including cargo lists, tribute or debt (SCHAEKEN 2012, 13-71). The Bryggen inscriptions, named after the famous Bryggen excavation in Bergen, Norway, is compiled of almost 700 runic inscriptions on bone

► Fig. 21. Barrels and bundles were stowed on top of each other in the hull of the Gdansk Copper Wreck (modified after Ossowski 2014, fig. 20).



and wood dating from the 11th to the 14th century. Most of the inscriptions were used as markers of property while personal texts proved the everyday use of runic language at least until the Late Middle Ages (SPURKLAND 2010, 131-202).

Conclusion

The technology of medieval maritime trade is a broad field covering instruments, containers, vehicles and currencies as well as the infrastructure and topography of trading sites. It spans not only a wide area and an extensive chronological depth, but was also subject to numerous changes. "The" technology of medieval trade did not therefore exist. Instead, we are dealing with a whole series of various aspects which on the one hand were continually adapted to dynamically changing basic conditions and needs and on the other hand, however, drove developments themselves. The aim of this paper was to provide an overview of the archaeological legacy of these technologies; in the process, special importance was granted to the trade-related topography, a rather peripheral topic up to now among the otherwise comprehensive literature on medieval trade and traffic.

In order to do justice to the diversity and dynamic of the topic, an approach was selected that would enable an insight into – to showcase as it were – three different historical situations. At the centre of the considerations stood in each case a historically important and archaeologically well-researched trading centre whose topography and infrastructure were analysed. Furthermore, the material legacy of the corresponding period was presented, which was able to provide information on mobility, transport, bartering and purchasing, weighing and measuring, as well as control, credibility and security.

The case studies comprised the historic *Reric* (Groß Strömkendorf) in the Bay of Wismar, Schleswig and Lübeck. At *Reric*, a *Seehandelsplatz* of the 8th and early 9th centuries, the early organisation of a still relatively manageable long-distance trade in the Baltic Sea region was able to be demonstrated, whose mainstay was still, according to the archaeological sources, probably trade by barter. However, this was already changing towards the end of the Early Middle Ages, when a monetary economy based on the weight of hacksilver coins was introduced and then enjoyed wide acceptance. A brief digression inland also illustrated several extensive infrastructure and trade exertions of Carolingian as well as Viking rulers.

The increasing professionalisation of long-distance trade and the associated technological changes were demonstrated by the example of Schleswig, which was established shortly after the middle of the 11th century. The topography, adapted to sea-based trade, comprised a waterfront that joined together the harbour, private commercial property

and a public marketplace, several so-called merchants' churches as well as comprehensive facilities for the protection and control of town and trade. In addition, changes in shipbuilding, shipping operations and also the introduction of local coinage have been discussed.

In the end, the change to an urban topography made it clear, on the basis of the most recent results from the large-scale excavations in Lübeck, how it was to become characteristic for the Hanseatic towns in the 13th century and beyond. The confident status of a now largely independent and well-networked merchant was reflected in the prestigious hall houses, impressive church buildings and town halls and also a business-orientated harbour operation. At the same time, rapidly rising literacy towards the end of the Middle Ages, which, as was able to be shown, is tangible in archaeological finds, ensured not only decisive technological advances but also a clearly better source for research into late medieval trade technologies.

To summarise, the insights presented here should have illustrated not only the diversity and complexity of medieval trading technologies, but were also able to demonstrate what contribution archaeology was capable of accomplishing in the interaction with the parallel tradition. If it is suggested, for future consideration, to devote more attention to the topography of trading centres, it can also be regarded as an integrated expression of trading technologies which merged with almost all aspects of medieval society.

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Trade and containerisation

Perspectives from the medieval Indian Ocean world

by ELIZABETH LAMBOURN

Indian Ocean, containerisation, medieval, ceramics, sacks, bales, textiles

This contribution begins with an overview of the scholarship on pre-modern Indian Ocean trade and current knowledge about technologies of trade in the western Indian Ocean. Viewing containerisation as a distinct and often neglected technology within tools of exchange, the sources and issues associated with the understanding of historical practices of containerisation of traded commodities across this vast, culturally diverse area are then explored in more detail. Parts two and three of the contribution focus on both hard containerisation in the form of ceramic storage and transport jars, and on soft containerisation as represented by sacks and bales. Although ceramics are the most visible and durable indexes of medieval exchanges and trade, in the Indian Ocean world textile bales and sacks were the preferred materials for packing and transporting solid commodities. Future studies of Indian Ocean trade must continue to work with both technologies, however varied their patterns of survival and problematical their interpretation.

Handel und Containerisierung.

Perspektiven aus der Welt des Indischen Ozeans während des Mittelalters

Indischer Ozean, Containerisierung, Mittelalter, Keramik, Säcke, Ballen, Textilien

Dieser Beitrag beginnt mit einem Überblick über die Forschungen zum vormodernen Handel im Indischen Ozean und den aktuellen Wissensstand hinsichtlich der Technologien des Handels im westlichen Indischen Ozean. Unter Berücksichtigung der Containerisierung als eigenständige und oft vernachlässigte Methodik innerhalb der Austauschinstrumente werden dann die Quellen und Fragen im Zusammenhang mit dem Verständnis der historischen Praktiken der Containerisierung von Handelsgütern in diesem riesigen, kulturell vielfältigen Gebiet näher untersucht. Die Teile zwei und drei des Beitrags konzentrieren sich sowohl auf die harte Containerisierung in Form von keramischen Lager- und Transportgläsern als auch auf die weiche Containerisierung mittels Säcken und Ballen. Obwohl Keramik der sichtbarste und haltbarste Indikator für mittelalterlichen Austausch und Handel ist, waren in der Welt des Indischen Ozeans Textilballen und -säcke das bevorzugte Material für die Verpackung und den Transport von festen Gütern. Zukünftige Studien über den Handel im Indischen Ozean werden weiterhin beide Materialgruppen untersuchen müssen, auch wenn ihre Erhaltungsmuster unterschiedlich und ihre Interpretation im Einzelfall problematisch bleiben werden.

Trade in the scholarship on the Indian Ocean world

The Indian Ocean world encompassed from the beginning an extraordinary range of trade systems and practices which only increased in complexity and variety as trans-regional trade boomed from the 8th century onwards. Long-distance trade in the premodern Indian Ocean world operated overwhelmingly through intersecting regional circuits, only rarely was direct voyaging between the extreme ends of the ocean undertaken (ABU-LUGHOD 1991; BEAUJARD 2019). Modern definitions of the Indian Ocean (Fig. 1) delimit an area extending from the Gulf and Red Sea in the west to East Asian waters, commonly called the China Sea, in the east, and on the north-south axis from the northern Indian Ocean coasts down to southern Africa and western Australia where it joins the Southern Ocean at the latitude of 60°S. In practice, the natural maritime connectivity between the Gulf of Thailand and the China Sea has meant that Indian Ocean studies extend into the western Pacific, or Indo-Pacific. Geographical definitions aside, until the advent of steam allowed regular open-ocean crossings, circulation across this vast area was heavily patterned not only by the monsoon system

prevalent above the equator, but also by the comparative safety afforded by coasts and islands. The open-ocean crossings between Malabar and the Arabian Peninsula and between the Coromandel coast or Sri Lanka and areas along the Straits of Malacca were the principal long-distance routes sailed in the medieval period while in practice, the Indian Ocean below the equator was only rarely traversed. The settlement of Madagascar around 700 CE by Austronesian populations originating in southern Borneo, now believed to have been undertaken through open ocean voyages of over 3,000 km (1,600 NM), perhaps via the Chagos Islands, represents the longest ocean voyaging known in the area before the modern period (WILMSHURST *et al.* 2011, 1815-1820; HOOGERVORST/BOIVIN 2018). Only during the later 8th and 9th centuries did ships sail directly between the Gulf and eastern China (HOURANI 1995; BELITUNG WRECK 2004). Yet even within these narrowed parameters, the distances involved remained huge; at 70,560,000 km² (27,240,000 mi²) the Indian Ocean is the world's third largest ocean or, put another way, it represents 1/3 of the globe's oceanic surface.

Over the course of the last two decades the Indian Ocean has become an established unit of study

▼ Fig. 1. Principal regions and sites mentioned in the chapter.



and embedded in the institutions and structures of academia. The Indian Ocean is an exciting place to do archaeology and to write history because of the wealth of new sites and source materials constantly emerging but it should be obvious from what follows, that the narrative is barely half written and that no synthetic overviews of many of the technologies of interest to this research project are yet possible. A thriving body of scholarly literature has been generated both as a direct contribution to Indian Ocean studies and as part of more nationally or regionally focused inquiries into maritime spaces and histories. Medieval trade is a prominent leitmotif of survey works on the Indian Ocean itself (PEARSON 2003; SHERIFF 2010; BEAUJARD 2012; 2019; ALPERS 2013) and of more regionally focused studies (monographic, co-authored and edited) such as those on East Africa (HORTON/MIDDLETON 2001; WYNNE-JONES/LA VIOLETTE 2018), the Red Sea (LUNDE/PORTER 2004; POWER 2012), South Asia (WINK 1990; MALEKANDATHIL 2010) and its sub-regions, notably Malabar (KOORIA/PEARSON 2018; PRANGE 2018), western India (SHEIKH 2010; VARADARAJAN 2011) and the Bay of Bengal area (MUKHERJEE 2006; 2011), maritime South East Asia (LOMBARD 1990; REID 1990; LIEBERMAN 2003-2009), and East Asian waters (SEN 2003; SCHOTTENHAMMER 2007; 2008). The islands of the Indian Ocean and their trade are most often subsumed within larger regional or thematic studies although a number of edited volumes specifically on islands include material relevant to medieval trade (BIEDERMANN/STRATHERN 2017; SCHNEPEL/ALPERS 2018). The advances of the last two decades are noticeable when looking back at pioneering early surveys such as Kirti N. Chaudhuri's *Trade and Civilization in the Indian Ocean. An Economic History from the Rise of Islam to 1750* (CHAUDHURI 1985) which in fact included few examples that were both medieval and directly maritime. This is a reflection of the comparative paucity of synthetic studies available in the 1980s and both the heterogeneity and poor publication of primary source materials. Even some more recent surveys and edited volumes promising medieval coverage in fact present material overwhelmingly focused on the period after 1500. The excavation or identification of new source materials, their interpretation and wider circulation, remains key to the development of trade histories of the Indian Ocean before 1500 and explains why this chapter takes the opportunity to focus on the question of the containerisation of bulk trade.

Today, histories of medieval trade are recoverable to varying degrees through a wide range of primary sources, written and material, and increasingly through genomic data derived from aDNA (ancient DNA). The ERC-funded Sealinks Project (2008-2013) was crucial in demonstrating the wealth of faunal, botanical and human

genetic material that could be recovered at many Indian Ocean sites and the rich data that could emerge from its analysis and broader interpretation (among the many project publications see FULLER *et al.* 2011; JONES *et al.* 2013; CROWTHER *et al.* 2016). Nevertheless, data on trade remains unevenly spread across this huge area reflecting both the variety of regional cultural traditions and practices, different local conditions of survival for material and/or written sources, and diverse colonial and national engagements with history and archaeology since the 19th century. In practice this means, for example, that for eastern and southern Africa no autochthonous written sources survive before 1500, with the exception of a small number of Islamic inscriptions, even though the area has a long tradition of archaeological investigation and more recently has been at the heart of new techniques of aDNA recovery and analysis. China, by contrast preserves, in addition to archaeological material including abundant shipwrecks, architectural remains and detailed written records for coastal ports and trade thanks to its extensive bureaucratic systems and the good preservation of these sources.

In South and South-East Asia, many written documents for medieval trade history survive in the form of charters and grants on stone, or incised onto copper plates, since writing supports such as palm leaves and paper cannot survive long in the monsoon climate (SALOMON 1998; DAVIS 2017). Tombstones constitute another important epigraphic category particularly for Muslim trade communities (GUILLOT 1998-2003; GUILLOT/KALUS 2008); graffitos and dedicatory inscriptions represent another sub-category (for example STRAUCH 2012). However only a fraction of these written sources have been fully published, in no small part because of the variety of regional languages and scripts in which they are written and the decline of epigraphy as a discipline over the course of the twentieth century. Ranabir Chakravarti's consistent use of medieval epigraphy for the study of medieval Indian trade (for example CHAKRAVARTI 2004) and the equally prominent use of epigraphy in the study of Tamil trade networks (CHRISTIE 1998; KARASHIMA 2002 to cite just two) illustrate the huge potential of this material. Beyond these epigraphic sources, however, documents are otherwise rare. The earliest and largest surviving documentary corpus for the Indian Ocean are the *ca.* 500 items relating to Jewish trade with India during the late 11th and 12th centuries preserved in the Cairo Genizah and which are still in the course of publication (GOITEIN 1973; GOITEIN/FRIEDMAN 2008; 2009; 2010a; 2010b; 2013). Second are the documents excavated from the Ayyubid layers (ruled 1171-1260) at the port of Quseir on the Red Sea coast, here again only a portion have been published (GUO 2004) while work on integrating textual and archaeological sources is still in its infancy (BURKE 2007).

Archaeological data across the area is no less varied, patterned by local climate (the monsoon is unkind to organic remains and the aDNA it might preserve), highly variable national engagements with, and investments in, archaeology, and by increasingly transparent nationalist agendas. These variables are rarely discussed in formal academic literature but form part of the knowledge base of all field-work-active researchers across this area.

The complexity of the source materials and their very uneven patterning probably explains why more narrowly focused studies often offer better coverage of medieval trade, even if they may not always position themselves explicitly within Indian Ocean studies or offer comparative perspectives. Port sites or entrepôts constitute a prominent unit of analysis, their study contributes to understandings of traded commodities, the physical settings and infrastructure of trade as well as filling out sometimes sketchy understandings of trade networks and mercantile communities. Port studies are available for sites on the Swahili coast (CHITICK 1974; 1984; HORTON 1996; MEIER 2016), the Red Sea (PEACOCK/BLUE 2006; 2011; VAN DER VEEN 2011), the Gulf and Arabian Peninsula (MARGARITI 2007; WHITEHOUSE 2009; ROUGEULLE 2015), South Asia (SHOKOOHY 1988; 2003; SHOKOOHY/SHOKOOHY 2010; NANJI 2011; CARSWELL *et al.* 2013), South East Asia (GUILLOT 1998-2003; GUILLOT/KALUS 2008; PERRET/SURACHMAN 2009) and East Asia (SCHOTTENHAMMER 2001). Nevertheless, the very varied scales and approaches of these volumes – some archaeological, some architectural, others epigraphic, some combining multiple sources, some monographs, others multi-authored edited volumes like the last two – also makes direct comparison extremely difficult. A number of port-focused edited volumes have also been published (MUKHERJEE 2014; BOUSSAC *et al.* 2016). More generally, these and other major topics are covered in single articles or book chapters found across an extraordinarily wide range of publications. A French database project APIM (Atlas des Ports et Itinéraires Maritimes de l'Islam Médiéval) gathers substantial data on medieval ports either located directly in Islamic lands or that were part of substantially Muslim networks but is not yet openly accessible (APIM no date).

Focused discussions of regional trade or trade systems in the medieval period are more often found within the context of the survey works and port studies just discussed, a reflection no doubt of the challenges involved in developing *longue durée* or even medium range synthetic studies from such uneven sources. Only a very small number of monographic studies and edited volumes focus specifically on regional trade or trade networks in the medieval period – for example for India (JAIN 1990; CHAKRAVARTI 2020), the Yemen (VALLET 2010) or the East Asian-western Pacific area (SEN 2003;

HENG 2012) – or on specific mercantile groups or trade diasporas (ABRAHAM 1988; RISSO 1995; LOMBARD/AUBIN 2000; FEENER/SEVEA 2009; CHAFFEE 2018; LAMBOURN 2018).

The Indian Ocean world has nowhere near the thickness or consistency of maritime archaeology of the Mediterranean or North Sea. If the Red Sea, the Gulf, the Swahili and Chinese coasts have seen regular and thorough archaeological excavations, and South East Asia is fast catching up, South Asia still presents sometimes substantial blanks. Besides excavations of port sites (see earlier bibliography for archaeological investigations), medieval shipwrecks and their cargoes are increasingly being identified and studied particularly in the eastern sector where shallower waters make their location and recovery much easier than in the western Indian Ocean (FLECKER 2002; BELITUNG WRECK 2004; HARKANTININGSIH *et al.* 2010; KRAHL *et al.* 2010; LIEBNER 2014). Important sections relevant to medieval Indian Ocean trade can also be found in commodity histories, for example for sugar (SATO 2015), aromatics (MCHUGH 2012) or textiles (RIELLO/PARTHASARASTHI 2009) and in museum catalogues (for Indian textiles BARNES 1997, for example). However it is probably true to say that the majority of scholarship on medieval Indian Ocean trade is still found in single articles or book chapters spread across an extraordinarily wide range of journals or edited volumes. Edited conference volumes as well as *Festschriften* for colleagues represent another important output. In 2013 Palgrave began its Indian Ocean World Studies series which now includes 22 thematic volumes, many edited, with a broad temporal frame that often includes substantial medieval material (for example SCHOTTENHAMMER 2019). Ohio University Press followed shortly afterwards with its Indian Ocean Studies series; additionally Harrassowitz Verlag's East Asian Maritime History regularly explores the Indo-Pacific frontier (SCHOTTENHAMMER 2008; KAUTZ 2010). Routledge's pioneering Indian Ocean Series begun in 2000 has had a more chequered history. Primus Books, publishing out of Delhi, is a reliable source of monographs and edited volumes on various aspects of Indian Ocean studies. These patterns in the scholarship are due in no small part to the comparative youth of the field and the suitability of the article format for presenting new primary sources or exploring new approaches. However, the heterogeneous nature of the sources and scholarship themselves also make mesoscale synthetic studies challenging to write.

It is against this background that the following sections of this contribution address some of the key issues about technologies of trade posed by the ERC project WEIGHTANDVALUE. Due to the author's expertise on the western Indian Ocean and exchanges between the Middle East and South Asia the following sections mainly focus on this area.

Terminology

Rich epigraphic remains from South Asia and textual sources from the Islamic world have left plentiful linguistic evidence for the terminologies used to refer to merchants and traders. While the dominant term in Arabic is *tājir* (pl. *tujjār*), commonly translated as trader or merchant (dependent on context), South Asian epigraphy reveals a far wider range of terms (see SIRCAR 1960) however there currently exists no synthetic survey of their application at specific periods or their changing use over time. One Sanskrit term, *vanij*, found its way into multiple northern and southern languages becoming, for example, *vanikar* in Tamil. The wide prevalence of the term in the Indian Ocean world is borne out by its arabicisation as *baniya* in medieval Arabic to designate any South Asian merchant community or individual. Some of the more focused studies of specific occupations and terminologies make clear that ownership of the infrastructure of mobility (ships) conferred particular power and prestige as seen in CHAKRAVARTI's (2000) work on the title *nauvittaka* (one whose wealth is derived from ships) in Sanskrit and the Indic languages, and the term *nakhuda*, literally "ship master" in Persian and Arabic. Work on Genizah documents has only reinforced this centrality while building on Chakravarti's work (see the extensive discussion in GOITEIN/FRIEDMAN 2008, 125-156). CHAKRAVARTI's (2020) work on the role of the so-called *nājaśresthī* or "royal merchant" is equally important in confirming that Indian rulers also participated directly in maritime trade via appointed merchants, and sometimes owned their own ships, a situation seen again among Muslim polities around the Arabian Peninsula and along the Gulf notably through Geniza sources. Many other trade-related titles and terms are known, some widely used such as *shabbandar* or 'port master' (MORELAND 1920; MATTHEE 2012), others more regionally specific such as *pati* (GAMLIEL 2018). Many more are attested through epigraphs, documents and other sources and still remain to be thoroughly studied.

Social and political organisation of trade

The exponential growth of maritime trade in the Indian Ocean from the 8th century onwards was accompanied by a corresponding increase in human circulation which in turn diversified the landscape of trade even further. Diaspora networks have been a feature of Afro-Eurasian trade since prehistory, this continued to be the case in the medieval Indian Ocean but was accompanied by a major diffusion of what eventually became world faiths. The centuries after 700 CE are widely recognized to have been a critical period in the Islamisation of eastern Africa, South Asia and maritime South East Asia largely as a result of mercantile settlement and inter-marriage (WINK 1990; RISSO 1995). We

should, however, be wary of thinking of Muslim traders as a monolithic block, the enlarged Muslim umma was as ethnically, linguistically and culturally diverse as it was religiously varied. Furthermore, Muslims from the Arabian Peninsula and Eastern Mediterranean were initially only one of many West Asian merchant diasporas of different faiths who engaged in Indian Ocean trade, notably Zoroastrians, Eastern Christians and Jews (WINK 1990). In the Indian Ocean area they traded with Jain, Hindu and Buddhist mercantile communities who, in the last two cases, played an equally important part in the spread of their faiths beyond South Asia (SEN 2003). Sojourners, usually male, became permanent residents and begot new bi-cultural and bi-lingual communities which in turn hosted new arrivals and assisted them in their trade. The example of the Tamil Muslim merchants, whose material culture and language make them a wholesale part of the southern Indian Tamil world (SHOKOOHY 2003), underlines the dangers of relying exclusively on religious labels to understand mercantile groups and cultures.

The ample literature on ports and regional trade systems leaves no doubt that the ports and entrepôts of the Indian Ocean rim were home to a rich patchwork of mercantile communities, usually living in their own quarters and provided with their own places of worship and, if necessary, burial grounds. Written sources, literary and epigraphic, suggest that in much of the Indian Ocean world, as across wider Afro-Eurasia, mercantile communities of all faiths operated semi-autonomously within their host polities and each had their own head or representative, often appointed in consultation with local authorities. At the community level, law followed the Late Antique principle of legal extra-territoriality, the notion that faith or community specific legal principles and practices operated within communities irrespective of the location in which they resided (LAMBOURN 2008, 56-60). The surviving written evidence is only rarely of sufficient resolution to capture detailed examples, however, the Cairo Genizah documents suggest that Middle Eastern Jews in India had their own courts for the resolution of communal or internal trade disputes. Although we have no synthetic study of the issue, primary source material from South Asia and the Far East suggests that it was only in cases requiring capital punishment, notably for murder, that legal authority passed upwards to the local ruler or governor or, in China, if the dispute was between two different trade communities. The situation may have been different on the sparsely populated Swahili coast which lay outside the direct control of landed polities and may have allowed full autonomy, however, at present we lack the written or material evidence to clarify this situation.

All trade systems are meshes of networks of varying scales. In the Indian Ocean system, trade was

heavily reliant on chains of intermediaries, fronted at port level either by formal trade associations, by state officials, by acculturated longterm sojourners or more loosely organised individuals, or indeed by a combination of these. With commodities originating deep inland or in challenging, alien environments such as rainforest or desert, very few merchants traded directly at source. Indeed, the sources of valuable commodities may have been kept obscure deliberately to control supplies, prices and ultimately maximise tax revues. Ports and entrepôts constituted the termini of complex and extensive networks supplying items such as gold, ivory and slaves from local and regional miners, hunters or brokers across Africa (WYNNE-JONES/LA VIOLETTE 2018), spices, aromatics, birds and other forest products obtained from foraging communities in South and South East Asia (MORRISON 2002; PTAK 2012), iron and high grade steel produced by artisans in southern India and Sri Lanka (CRADDOCK 2013), printed cottons from crafts communities in western India (BARNES 1997), horses herded by pastoralist or bedouin communities in Iran and the Arabian Peninsula (LAMBOURN 2016b), to highlight just a few commodity networks. Many supply networks ran to inland centres of production but we should also recognise the importance of regional maritime networks in the supply of major ports and entrepôts such as Khambhat, Aden or Guangzhou. Within a trade system as complex and large as this the idea of “source” is relative and from the perspective of Middle Eastern merchants, for example, the ports of southern India or China represented a substantial leap closer to the source of commodities such as pepper or porcelains even if they remained distant from the sources of production themselves. Greater proximity to sources likely ensured access to better quality, unadulterated products, on occasion it also allowed for a production more tailored to export tastes, as is seen in the case of Indian textiles made for the Middle Eastern and South East Asian markets (BARNES 1997) or Chinese porcelains made for the Middle East (KRAHL *et al.* 2010). However, probably the most significant benefit was the increased profit gained by cutting out at least some of the middle men involved in such long supply chains.

One notable characteristic of South Asian trade between the 8th century and 13th centuries is the existence of formalised mercantile associations or groupings, *vaniggrama* or “community of merchants” in Sanskrit (CHRISTIE 1998, 242). While some appear to have operated at the level of a single urban centre, others such as the Ayyavole 500, originally from Aihole in what is now Maharashtra, were active trans-regionally. They and other associations have left donative inscriptions across South and South East Asia, and even in coastal China (ABRAHAM 1988; CHRISTIE 1998; KARASHIMA 2002; SINOPOLI 2003, 103-105; SUBBARAYALU 2012; 2015) which not only map their core net-

work but provide valuable insights into their organisation, trade and religious practices. There is every reason to suppose that the Indian merchants who visited and settled at other Indian Ocean ports and trade centres – the Yemeni city of San’a famously had a *baniya* quarter where Hindus and Jains resided (SERJEANT 1983), medieval Quanzhou had Hindu temples built in the southern Indian style to serve its Tamil merchant community (GUY 1993-1994) – continued to operate within these structures even if we currently lack direct evidence for this. In South Asia, West Asian merchants and other diasporas are unlikely to have been unable to operate without the agreement of Indian trade associations and may, on occasion, have adopted similar institutions. The *Anjuvanam* is believed to have been a trade association of West Asian merchants and is referenced in inscriptions at various ports sites in southern India up until the 13th century (SUBBARAYALU 2012). Chinese sources too speak of a head of “foreign” merchants (CHAFFEE 2018). Trade associations such as these are probably only the top, the most visible component of a complex mercantile social landscape comprising groupings structured as much by occupation as by faith or language. Roxani MARGARITI (2014b) has exploited the high resolution of Genizah documents to give a detailed insight into the non-Jewish business partnerships of Jewish traders in India in the 12th century but on the whole only a handful of sources give us detailed insights into these exchange relations.

Tools of exchange

Information about tools of exchange in the Indian Ocean world is peppered across sources with few synthetic overviews to date. Nevertheless, as one would expect of a trade system made up of overlapping regional circuits, tools remained extremely varied across the area in the premodern period and merchants and intermediaries are likely to have been able to operate within multiple tool sets at any one location.

There is no convincing evidence for the idea that Arabic became the *lingua franca* of premodern Indian Ocean trade although it is true to say that many languages across the Indian Ocean integrated Arabic and Persian loanwords, and in some cases adopted the Arabic script too (Tamil and Malay for example among Islamised communities). If anything, local documents and inscriptions suggest that regional languages remained important, with longterm sojourners and diasporas effectively bi-lingual to the extent that they often integrated regional administrations (CHAFFEE 2018 for China; SHOKOOHY 2003 and LAMBOURN 2016a for South Asian examples). The Genizah documents evidence the extent to which Indian loanwords permeated the language of Middle Eastern Jewish communities, sometimes even several generations

after they had ceased travelling to India for trade (LAMBOURN 2014).

Merchants would have needed to be bi-lingual also in a more metaphorical sense when dealing with local currencies, and systems of weights and measures. Roxani MARGARITI's (2014a) work on monetisation in the western Indian Ocean during the 12th through 14th centuries shows that multiple currencies circulated, requiring merchants to have detailed understanding of each system and grasp of fluctuating exchange rates. However, trade was by no means uniformly monetised across the area. New studies of cashless economies in the Bay of Bengal region (DEYELL/MUKHERJEE 2020), passing references in Genizah materials to the importance of barter and payment in kind in exchanges with the Horn of Africa and southern Red Sea coast and new perspectives on the actual uses of coins in pre-colonial eastern African (WYNNE-JONES 2019) make the point that coins were minted in only a few places and enjoyed very varied patterns of adoption and usage. Because of coinage's value as raw metal, numismatic data is especially endangered in the Indian Ocean world, dependent for its survival on strong archaeological and legislative structures to protect and record finds. If not sold on and melted down locally without trace, many of the coins circulating in the art market come with no provenance or archaeological context which substantially decreases their evidential potential. The varied forms and functions of tools of exchange are nowhere better exemplified than by Indian Ocean cowries which served extensively both as a tool of exchange and for personal adornment across the area, and beyond into mainland China (YANG 2004) and West Africa. In spite of this, the first large-scale research project on cowry production, circulation and consumption in the Indian Ocean world is only now nearing completion (Anne Haour PI: Cowrie Shells: An Early Global Commodity [Leverhulme Trust Major Research Grant, RPG-2014-359, 2014-2019]).

Surviving merchant accounts from the Cairo Genizah, drawn up by Jewish merchants trading and running workshops in India, show that they used Middle Eastern accounting systems in their dealings with partners and colleagues back in the Middle East (for example accounts interspersed with a court document and a letter in GOITEIN/FRIEDMAN 2008, 258-262, 337-351). However, workshop accounts involving Indian workmen use local terms both for coins and weights (GOITEIN/FRIEDMAN 2008, 635-643), a clear hint of the bi-cultural, or indeed multi-cultural, competencies of many merchant communities in the Indian Ocean. Material evidence for the metrological cultures of the medieval Indian Ocean is, however, rare with one exception. Medieval shipwrecks from East Asian waters have yielded a significant number of copper alloy weights and scale bars. These finds have allowed some unusually focused metrological

research by Michael Flecker, proving the use of an Indonesian metrological system and thus the Indonesian origin of the finds (see BELITUNG WRECK 2004, 660-663 with further bibliography). With no excavated medieval shipwrecks from the western Indian Ocean these assemblages can so far only be compared to (and clearly differentiated from) a number of later Chinese scale sets. To my knowledge, no or few weights or scale bars of the medieval period have been found, or at least identified, in other archaeological contexts around the Indian Ocean, Flecker's thorough study of the Indonesian weights is at present a unique archaeological contribution to the metrological history of the medieval Indian Ocean.

This last point brings me to the main focus of this chapter. Perhaps one of the largest gaps in our understanding of premodern Indian Ocean trade remains that of its volume. With almost no surviving documentation from port sites (for an exception see NÜR AL-MA'ARIF 2003-2005 and VALLET 2010) and a still negligible number of shipwrecks for the period before 1500 we struggle to even estimate the volume of commodities and numbers of ships circulating in any one circuit. It should come as no surprise perhaps that one period with at least some data is the Classical period of Indo-Roman trade. One of the few estimates of the number of ships trading between the Red Sea and India, at any period before 1500, is that of the Roman geographer Strabo who, in the 1st century BCE, observed that up to 120 ships a year sailed from the Red Sea port of Myos Hormos (medieval Quseir) to Muziris in southern India, a site possibly somewhere near the modern town of Kodungallur in Kerala. Given that Roman trade was also active from other Red Sea ports one can perhaps double that to over 200 ships a year, but this remains pure guesswork and obviously leaves out the possibly even busier trade between the Sassanian controlled Gulf and western India, and estimates of Indian and South East Asian shipping running on these and other routes. Nevertheless, coupled with data on ship tonnages we have at least some estimate of the volume of annual trade along one route in the western Indian Ocean. Roman merchant ships typically had a capacity of around 100 to 150 t although ships of up to 600 t are recorded and are known to have been used on the Red Sea route to India (DE ROMANIS 2012). Even if we take the lower median capacity of 100 t and only 120 ships per annum, the volume of trade along the Myos Hormos-Malabar route would have been in the region of 12,000 t a year, easily double when the use of 600 t ships and other Red Sea ports is factored in. Ship data for the Indian Ocean trade from medieval sources is mainly concentrated on Chinese shipping where large junks able to carry 200 passengers and provisions for 50 days are mentioned from as early as the 5th century (TORCK 2009, 126). Far less information is avail-

able for South Asian and Arab shipping although shipwreck archaeology clearly indicates much smaller vessels. We still have only the very vaguest estimates of the cargo capacity of many medieval types of ship.

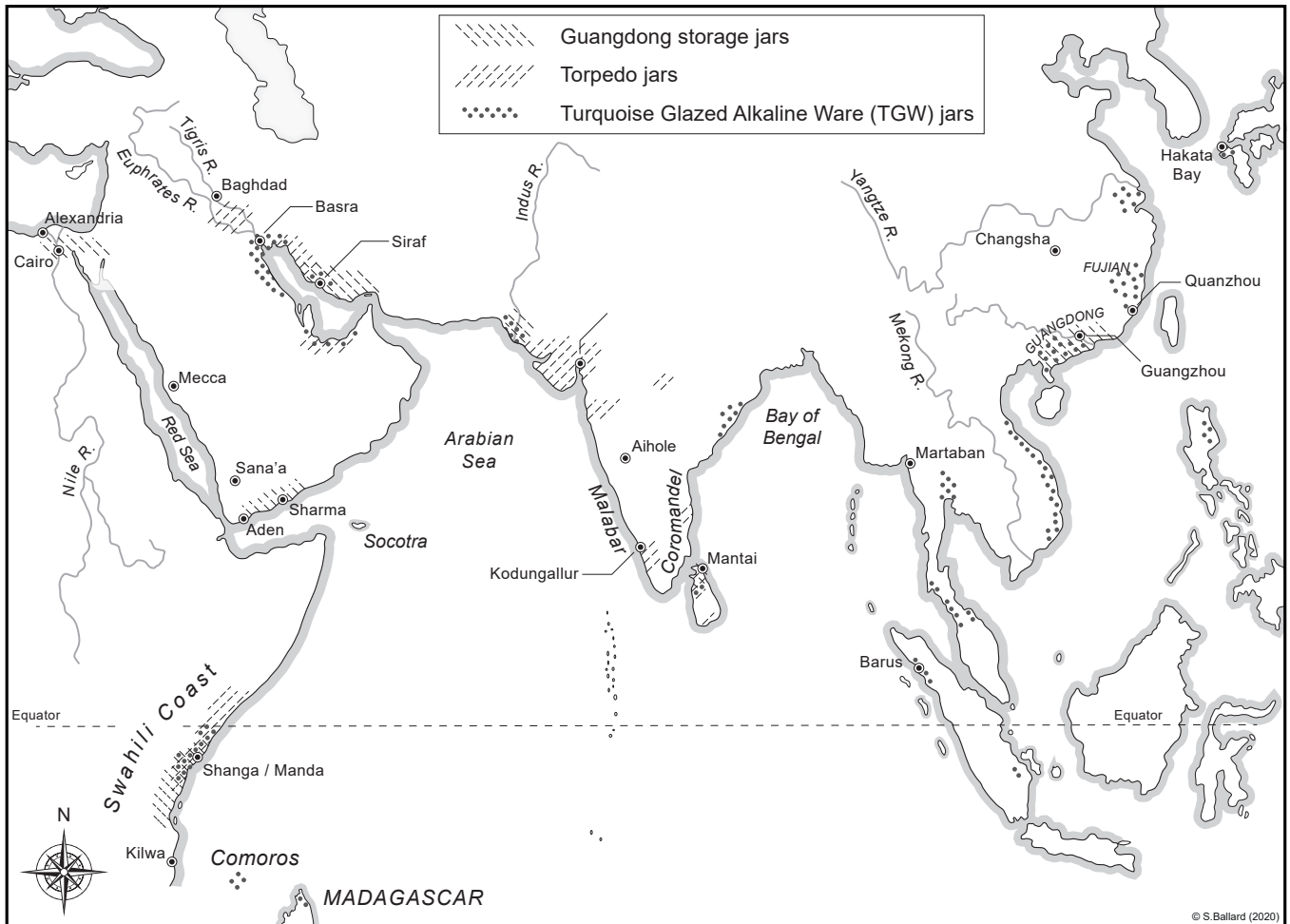
Faced with these problems, one approach pioneered for the western Indian Ocean by archaeologists Derek KENNET (2004) and Seth PRIESTMAN (2013) has been the quantitative analysis of ceramic evidence as a proxy for the long-term nature and volume of maritime trade. Of particular note is Priestman's *longue durée* study of what we might term the "pulse" of trade in the western Indian Ocean over nearly a millennium, from 400 to 1275 CE. Even it cannot estimate volumes of trade, this approach yields an important data set and represents a significant advance in our understanding of trade patterns. A valuable complementary quantitative approach that I wish to explore in this chapter begins at the opposite end of the scale, namely in the micro study of containers and their capacities. On the whole in the premodern Indian Ocean, trade commodities are studied and discussed with scant attention to their packaging and containment and, unlike the Mediterranean, we have no survey of Indian Ocean containerisation (BEVAN 2014). Rather than mapping regional patterns of trade over the *longue durée* via ceramics, this approach focuses on developing a far more holistic understanding of the spectrum of containerisation in Indian Ocean trade and the capacities of different technologies of containment. A broader approach to containerisation is needed since, although ceramics may serve as proxies for measuring patterns of exchange over time, they do not necessarily index trade itself. Ceramics are a complex category of object, besides carrying cargo, glazed and unglazed ceramics were traded as commodities in their own right while certain ceramic types such as storage vessels and tablewares also circulated in the luggage of passengers and crew for use during sea journeys. Above all, there is nothing to suggest that ceramic transport containers were the primary form of containerisation of commodities in the medieval Indian Ocean world. In the following two sections of my contribution I begin to sketch out an agenda for further study of containerisation as a tool of exchange.

Ceramic storage jars between cargo and provisioning

While we await a comprehensive survey of Indian Ocean containerisation one important technology is that of ceramic storage and transport jars. Whilst it is unlikely they were ever the primary method of containerisation, they have the advantage of surviving exceptionally well in the archaeological record compared to organic containers such as textile sacks and bales, basketry and waterskins. However, the interpretation of such sherds is by no means as simple as it first seems.

Undoubtedly the best studied productions of ceramic storage and transport jars are those of the Far East and South East Asia. China stands out in the *longue durée* history of Afro-Eurasia both as a pioneer in ceramic technology and in the development of industrial-scale ceramic production. From the early Jin period, 4th-5th centuries CE, Chinese kilns were producing large ceramic vessels for household storage and the transportation of bulk commodities. Such jars were used in China for household storage and are found in tombs as part of funerary assemblages (WONG 2017, 349). China was a ceramic pioneer and its development of high-fired stonewares and performant glazes meant that these containers were highly versatile in both domestic and commercial contexts. With their impermeable ceramic bodies such jars were not only excellent containers for dry commodities but; especially versatile for the containment of liquids they prevented loss through evaporation as occurs with unglazed earthenwares, as well as contamination of the contents through external seepage. The latter would prove particularly important during maritime transport when seawater or bilge water within the hold can easily damage cargo. This ceramic technology spread rapidly across mainland South East Asia seeding multiple traditions of storage jar production that continued into the 20th century and became one of the most recognisable forms of trade container. Although East Asian storage vessels have long been neglected by ceramic specialists for their coarse manufacture, this category of ceramic is now the object of serious attention, notably in a 2017 collection of workshop articles on storage jar traditions in China, Thailand, Vietnam, and Cambodia published in the *Bulletin de l'École française d'Extrême Orient* (vol. 103, 2017) with an excellent introductory overview of the field by Bing ZHAO (2017) "The production of storage jars in China and Southeast Asia: A vibrant but little-known artisanal practice". As the use of the term "artisanal" in the title hints, storage vessels such as these have generally received little attention in a field still driven by an art historical focus on high-end and Imperial ceramic wares. The publication of this set of articles is an important milestone in European scholarship, bringing a wealth of Chinese-language publications to a wider public.

One of the earliest East Asian storage jar types to be seen in Indian Ocean trade originated in kilns across Guangdong province on China's eastern seaboard at the height of the Tang trade boom with West Asia in the 9th century (Fig. 2) (WONG 2017; QIN *et al.* 2017). Extensive finds of kiln sites in Guangdong province leave no doubt as to their manufacture in this area (QIN *et al.* 2017, 362-363; WONG 2017) and Chinese archaeologists are developing a more refined understanding of vessel typologies and distinct kiln productions. Figure 3 shows a range of green glazed jars from kilns in Guangdong province recovered from the wreck of



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a ship that sank in Indonesian waters off the island of Belitung around 826 AD, possibly on its return journey to the Middle East from China, and known as the Belitung wreck (Fig. 1) (KRAHL *et al.* 2010; QIN *et al.* 2017, 364-367). Other Guangdong storage vessels were recovered from an earlier, recently

discovered wreck of the 8th century from Thailand known as the Phanom Surin wreck (GUY 2017), as well as from multiple sites across the western Indian Ocean. These finds leave no doubt as to the rapid adoption of these jars for maritime storage and commercial transportation. The principal cargo

▲ *Fig. 2. Approximate distribution of main ceramic storage jar types discussed in the chapter based on current data sets.*



◀ *Fig. 3. Range of green glazed Guangdong storage jars from the Belitung wreck, before 826 CE, now in the Museum of Asian Civilizations, Singapore (photograph courtesy of Choo Yut Shing, CC BY-NC-SA 2.0).*

of the Belitung wreck consisted of close to 60,000 Chinese ceramics, the majority so-called Changsha bowls, manufactured as their name suggests inland at kilns in Hunan, and destined for consumers in the Middle East (KRAHL *et al.* 2010). But alongside these were a substantial number of storage jars. Although still not comprehensively published (BELITUNG WRECK 2004; KRAHL *et al.* 2010) four jar sizes can clearly be distinguished: a plus-size large jar measuring 98 cm high by 77 cm in diameter (KRAHL *et al.* 2010, 235, no. 42); large jars ranging from 78 to 75 cm in height and 50 to 45 cm in diameter (KRAHL *et al.* 2010, 235, no. 43-45); a wide range of medium-sized jars measuring between 35 to 46 cm in height and between 32 and 50 cm in diameter (KRAHL *et al.* 2010, 235, no. 46-49) and finally the smallest jar sizes of between 23 or 24 cm high by 22 to 30 cm in diameter (KRAHL *et al.* 2010, 235, no. 50-54). Larger jars were excavated still packed with the Changsha bowls they transported, a well-documented Chinese practice, but traces of other commodities were also found in the smaller jars including star anise and lead ingots.

East Asian jars cannot, however, be read purely as indexes of trade. Very early on in the study of the Belitung material archaeologist Michael Flecker (in KRAHL *et al.* 2010, 101-109) suggested that besides their use for cargo, Guangdong jars would have been used for storing food and drinking water during the voyage. Certainly studies of the early modern production of martaban jars in Burma indicates that the very largest were “stationary reservoirs” mainly used for water storage, domestically and onboard ships, while smaller jars carried food-stuffs (BORELL 2014, 292). One example from the Belitung wreck (Fig. 4) has an inbuilt spout at its base, an adaptation obviously designed for the dispensation of a liquid, although it is unclear whether this vessel was actually in use onboard the ship or was a bespoke commission being shipped back to

a patron in the Middle East (BELITUNG WRECK 2004, 446-447, cat.-no. 160). Better understandings of hydration at sea, including sweet water provisioning, the technologies of its containerisation and the calculation of daily rations (TORCK 2009; LAMBOURN 2018), will hopefully help us to disentangle the use of these jars in provisioning *versus* cargo transportation but we can already take from this the fact that storage jars did more than contain cargo and should be interpreted carefully within their archaeological contexts (if at all possible) before they are used as indexes of trade.

While the Belitung remains something of a mystery, the only find before the 10th century of a vessel carrying substantial numbers of storage jars and export ceramics, the large numbers of Chinese ceramics including large jars found around the Indian Ocean indicate that this cannot have been a unique cargo assemblage. After the 10th century, wrecks with large ceramic cargoes are comparatively commonplace finds across South East Asian waters to the extent that they have become a focus of commercial archaeological exploitation due to the value of the ceramics (WADE 2003, 16-33). The initial demand for Chinese wares beyond East Asia and the enduring nature of this export trade can be explained by the technologically advanced nature of Chinese ceramics, even “coarse” or “artisanal” wares such as these, compared to the ceramic products of South Asia, the Islamic lands and East Africa, coupled with China’s ability to produce these on a massive scale.

Yet however much China shaped global ceramic culture, East Asian storage jars were only ever part of a larger landscape of ceramic containerisation. Eastern Africa and South Asia had very different but no less vibrant ceramic cultures. They both produced ceramics, as other crafts, at the local level – until the advent of plastic and stainless steel most Swahili and South Asian villages had a potter – with corresponding effects on the volume of production and ceramic distribution. Most importantly, however, both were predominantly earthenware ceramic traditions (SINOPOLI 1993; COOPER 2010; M’MGOBORI 2015). Glaze technology was only introduced to South Asia comparatively late in the medieval period, and then principally in the north of the sub-continent as a result of interactions with the Central Islamic Lands. East African potters never adopted glaze technology, at least during the medieval period. Both South Asia and East Africa employed earthenware jars in the domestic context, it is naturally porous and extremely efficient at cooling water by evaporation, in the case of large water jars, for example, and of course for storing or transporting dry goods. However, there is no evidence at present for the large-scale use of either East African or South Asian earthenware jars for the commercial containerisation of export commodities travelling by sea during the medieval period, very likely because of this problematical porosity.

▼ Fig. 4. Vat or liquid dispenser, Guangdong greenware, from the Belitung wreck. Height 90 cm, maximum diameter 62 cm. Museum of Asian Civilizations, Singapore, 2005.100906 (photograph by Jacklee 2011, CC BY-SA 3.0).



As a rule, in the medieval period, unglazed ceramics excavated at port sites overwhelmingly belong to local or regional ceramic traditions, evidence that they did not circulate through international trade networks in large quantities and are thus unlikely to have been used for the containerisation of bulk commodities. The exception that proves the rule is the entrepot site of Sharma on the Indian Ocean coast of the Arabian Peninsula where only a third of unglazed wares are of local production (ROUGEULLE 2015, 157) with the majority, the other two thirds, made up of Yemeni, South Asian and East African unglazed wares. Small and medium sized jars that may have been used for commercial containerisation are present in all three groups, however, the majority of earthenware forms at Sharma may be connected to cooking and food consumption rather than commercial transportation – part of the “tableware” assemblage that must have travelled onboard ships with passengers and crew – and we may wonder whether these jars were also used for domestic storage rather than in trade (ROUGEULLE 2015, 157-236). The exceptional proportion of imported unglazed wares found at Sharma may relate to the nature of the site: an entrepot located on a barren and sparsely inhabited part of the coast which may well have required those trading there to bring substantial provisions for the duration of the trading season. Analysis of residues from jars may help resolve the issue of whether they transported commercial goods or food provisions. In the meantime, Sharma illustrates perfectly the way in which ceramics, while efficient proxies for exchange – in this case remarkably direct and intense connections between Sharma, East Africa and South Asia between the late 10th and the late 12th centuries – may equate only indirectly with trade volume.

Unglazed and glazed storage jars were also an important ceramic category in the Central Islamic Lands and Arabian Peninsula. As in East Asia, however, such jars, while abundantly noted in archaeological reports, have received little dedicated study when compared to glazed tablewares, despite it being clear from what few surveys exist, that large jars were an important ceramic category both in the home and in certain areas of trade (SHADDOUD 2016). At present in the context of Late Antique to medieval Indian Ocean trade only two Islamic storage vessel types have received much attention: these are so-called torpedo-jars and another jar type belonging to the larger category of Turquoise Alkaline Glazed Wares (hereafter TGW), also referred to in earlier literature as Sasanian-Islamic wares because of the long timespan of their production and their continuity into the Islamic period.

Torpedo jars take their moniker from their distinctive torpedo-like shape and pointed bases. Fig. 5 shows a jar 113 cm in height recovered from the Belitung wreck (BELITUNG WRECK 2004,

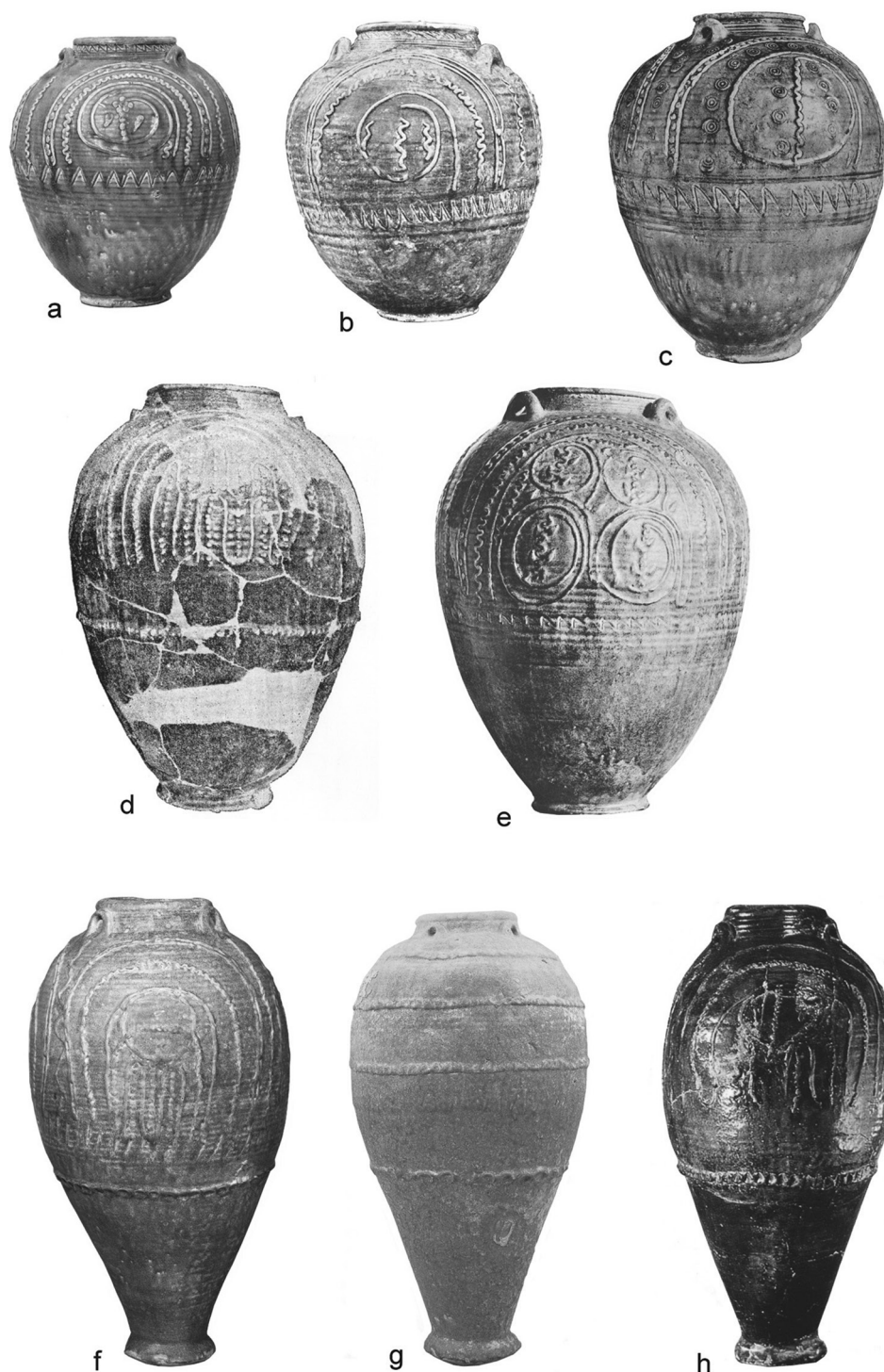
646-647, cat.-no. 294). Thanks to the pioneering work of Roberta TOMBER (2007) torpedo jars are now understood to be distinct from Mediterranean amphorae of similar shape, and the product of Mesopotamian and southern Iranian kilns (TOMBER 2007; TOMBER *et al.* 2020; CONNAN *et al.* 2020). Torpedo jars are unglazed vessels but were adapted for the transportation of liquids by the application of an internal coating of bitumen which effectively sealed their interiors. Torpedo jars were produced over an extremely long timespan, from the 1st to 9th centuries CE, a clear indication of the success of the jar type and its importance within the trade patterns of the period. Yet, as Jacques CONNAN and his collaborators (2020, 14) note, “despite the significant promise of torpedo jars as a source of evidence for understanding Late Antique and Early Islamic Indian Ocean trade, comparatively little is still known about them”. Debate still rages about the commodities transported in torpedo jars, possibly bitumen itself. Nevertheless, partly as a result of their treatment with bitumen, torpedo jars are currently believed to have been central to the wine trade between southern Iraq and Iran and elites in western and northern India during the 1st millennium CE (TOMBER 2007, 982). They are however far more widely distributed around the Indian Ocean, as the Belitung find indicates, and fragments of another six torpedo jars were recently recovered from the Phanom Surin wreck found at the head of the Gulf of Thailand (Fig. 2) (GUY 2017). The jars recovered in Thailand show evidence of later local reuse, perhaps for the transportation of water and provisions since a grain of rice and organic fibres were found adhering to the bitumen lining of several fragments (CONNAN *et al.* 2020, 19). Even if torpedo jars rank among the ceramics most clearly associated with commercial containerisation, the Thai finds are a reminder that commercial transport vessels often had long and complex afterlives once they entered the Indian Ocean area.

Another jar type widely distributed around the Indian Ocean are turquoise glazed jars, often decorated with applied designs. Fig. 6 shows the range of sizes and decorations seen in this ceramic type. Like torpedo jars, turquoise glaze wares were produced in southern Iraq and manufactured over a substantial number of centuries although the kiln sites have not been identified (HO 1995; GLOVER 2002). As their appellation suggests and as well illustrated by Fig. 7, they are characterised by a bright turquoise glaze produced through the incorporation of copper oxides. As seen in the last example and in Fig. 6, many jars are also decorated with elaborate applied, incised and sometimes stamped decoration. However, as Seth PRIESTMAN (2016, 3) has discussed in his study of this ware, TGW jars are unlike torpedo jars in that they belong within “a wide but distinctive set of vessel forms covering small open bowls to heavy basins, lidded vats, beakers and small



▲ Fig. 5. Intact torpedo jar recovered from the Belitung wreck, before 826 CE. Earthenware with bitumen lining, height 113 cm, southern Iraq (BELITUNG WRECK 2004, 647).

► Fig. 6. Turquoise glazed ware (TGW) jar forms, heights between 40 and 80 cm, mid-8th-10th century, southern Iraq (PRIESTMAN 2016).



dish-lamps". Additionally, even if TGW "represent one of the most extensively distributed Middle Eastern ceramic products within the Indian Ocean region" (PRIESTMAN 2016, 2), overseas finds are overwhelmingly concentrated in the mid-8th to 10th centuries, the trade boom of the Abbasid period (Fig. 2). Among the most widely distributed forms are medium to large sized jars, measuring between 40 and 80 cm in height (PRIESTMAN 2016, 3).

TGW jars have been loosely discussed as commercial containers, however, much about their original function remains unclear. PRIESTMAN (2016, 7, 24) noted the formal similarities between the smaller of these jars (Fig. 6a-c) and the contemporary Guangdong jars just discussed (Fig. 3), encouraging us to think of TGW jars in a commercial context, however, it is still far from clear what they were designed to contain and what they eventually served for. Larger jars are sometimes



◀ Fig. 7. Turquoise glaze storage jar with barbotine decoration of a bunch of grapes. Western Iran or Iraq, 8th century. Height 40 cm; diameter ca. 34 cm. The David Collection, Copenhagen, inv.-no. 27/2003 (photograph courtesy of P. Klemp).

mentioned in connection with the storage, or perhaps transportation, of date syrup, a staple food of the Gulf and Arabian Peninsula, although the evidence for this is scant (CHIUMEI 1995, 33). Some large TGW jars such as the example illustrated in Fig. 7 carry an applied decoration of bunches of grapes, a clue perhaps that they were designed to carry or store wine since such motifs are frequently found on Sasanian silver wine cups and ewers. Yet even if these assumptions are correct, much about TGW jars argues against a commercial usage. The bold turquoise glaze colour was unique in the Indian Ocean area and made even the plainest forms implicitly decorative. And while this glazing undoubtedly brought many advantages during maritime transport, the ornate decoration seen on many jars only amplifies their decorative appeal. Raised motifs especially would have been easily damaged during commercial loading and transportation, and when jars were packed side by side in a ship's hold. Rather, I would suggest that the fact that TGW jars were manufactured alongside tablewares and domestic items such as lamps, points strongly to

their original manufacture for use in domestic contexts, whether on land or at sea. In shipwreck assemblages too, although they are few, TGW sherds and intact vessels are relatively rare, for example this comparatively plain double handled amphora recovered from the Belitung wreck (Fig. 8) which was one of two TGW vessels recovered, and TGW sherds recovered from the Phanom Surin wreck (GUY 2017). These TGW vessels have usually been interpreted, not as commercial storage jars, but as part of the eclectic assemblage of cooking pots, tablewares, gaming pieces and other personal items carried by passengers and crew onboard ship (Fig. 8 catalogued as cat.-no. 292 under "Various Ceramics" in BELITUNG WRECK 2004, 642-643).

The distribution of TGW jars and other TGW vessel forms nevertheless indicates that they enjoyed complex afterlives beyond Iraq. The finds of TGW from Japan studied by Seth Priestman offer extremely clear archaeological contexts, one of which may in fact reinforce my earlier suggestion of a domestic rather than a commercial context of consumption. As PRIESTMAN (2016, 23) notes, the



▲ Fig. 8. Double handled TGW amphora. Iraq or Iran, 9th century. Height 28.2 cm (BELITUNG WRECK 2004, 643).

largest concentration of TGW jar fragments comes “from Japan’s main international port [Hakata] and specifically from the guesthouse at Kōrokan where foreign diplomats, traders and other official visitors were housed”. Perhaps then we can interpret these sherds as traces of the luggage and provisions of West Asian guests, rather than as containers of commercial commodities *per se*. Alternatively, given that gift exchange formed an extremely important part of trade and diplomatic missions, it is possible that these sherds represent the remains of jars of wine, date syrup or other coveted products brought directly from the Gulf area and destined as gifts. Beyond such direct interfaces, however, it is highly likely that empty TGW jars were refilled with other products, or indeed circulated empty as prized items in themselves. PRIESTMAN (2016, 24) notes a marked association between findspots of TGW jars and Buddhist sites in both Japan and China suggesting that they perhaps carried products (as yet unidentified) that were in demand within an East Asian Buddhist religious context. This may be the case, however, temples were economically and spiritually significant centres and it may simply be that such sites were natural foci for the donation or gifting of exotica. Discussions of TGW jars have often overlooked the simple fact that their stunning glaze colour was unique within the ceramic repertoires of the Indian Ocean world. For their colour alone such jars must have been prized and traded. Three large complete jars (see Fig. 6h) were discovered in Fujian among the funerary goods deposited in the tomb of Li Hua (d. 930 CE), the wife of the ruler of the Min Kingdom, where they probably served as everlasting lamps (HO 1995, 25, fig. 7a-b), clear evidence not only of their appropriation into Chinese funerary culture but their by now exotic status.

Volumetric capacities

An important missing data set within the whole question of ceramic containment within the Indian Ocean is that of the volumetric capacity of storage jars and their tare, the empty weight of the vessel itself, which together yield information about the total weight of a vessel when filled with a particular commodity or foodstuff. In Mediterranean archaeology it is increasingly standard practice to measure the capacity of storage or transport vessels; polystyrene balls offer a simple, cheap and accurate way of measuring intact vessels, but increasingly computational models and software packages such as Rhinoceros® and AutoCad® are offering solutions for the rapid survey of large assemblages, or for generating estimates of capacity for fragmentary vessels. Israeli archaeologists, including Israel Finkelstein have been particular pioneers in the application of computer techniques over the last decade (for example FINKELSTEIN *et al.* 2011) but the field is now evolving rapidly, leading a recent commentator to term this an “explosion” of am-

phorae studies (BEVAN 2014). A recent paper has been able to present a table of average capacities for over 250 different Roman amphora types (VIDAL/CORREDOR 2018). Nevertheless, as a recent paper by MORENO and collaborators (2018, 413) points out:

“the calculation of the capacities of ancient ceramic vessels remains a relatively unexplored area, owing to difficulties resulting from the archaeological record itself, including the small number of complete vessels available. This has resulted in a general shortage of studies devoted to volume and weight, including the diachronic evolution of old metrological systems from data obtained through the computational analysis of archaeological containers”.

For the moment we have capacity data for only one torpedo jar and none for TGW jars. In an innovative first step for Indian Ocean containerisation Jacques CONNAN and his team (2020, 3) had the capacity of a fragmentary torpedo jar from the Phanom Surin wreck estimated using 3D computer modelling. The analysis yielded a total capacity of 193 l, that is the vessel’s capacity if filled to the rim. Its effective capacity, *i. e.* its capacity when allowing headroom at the top of the container during transportation or storage, was not estimated however we might guess this at somewhere in the region of 180 l. To the best of my knowledge, no capacities have been calculated or proposed for large TGW jars, although with the largest around 80 cm high it is probable that they also had capacities of well over one hundred l. Data is similarly lacking for East Asian stoneware jars. Only one article from the *Bulletin de l’École française d’Extrême-Orient* special issue reports the capacities of the vessels discussed, container jars from the Maenom kilns, Thailand, with large jars holding “a liquid volume of about fifty litres and medium jars thirty-six litres, while small jars hold roughly twelve litres of liquid” (CORT 2017, 276). Better data is available for later martaban jars, the very largest of which might contain in the region of 420 l (BORELL 2014).

More consistent data on the volumetric capacities of the jars just discussed would certainly prove highly useful in bringing new data sets to the study of volumes of trade. Before this, however, it may also help us to better ground our interpretation of the different functions of jars, domestic storage versus commercial containerisation, and the technologies of handling and transportation associated with them. At 180 l effective capacity the Phanom Surin torpedo jar is much larger than the majority of Roman amphorae, the principal category of commercial storage jar for which we have extensive and accurate capacity measures (VIDAL/CORREDOR 2018). The size of Roman amphorae is believed to have been determined by manual handling constraints. Filled with water, or wine, or bitumen, a torpedo jar such as this would have been well be-

yond the lifting capacity of one man, and at the very upper limit of what two men might lift, and this even before we add the empty weight of the jar, its tare, which was unfortunately not estimated. Since in this instance there seems little doubt that torpedo jars were commercial containers, the figures, if proved accurate and consistent across known examples, seem to point to an entirely distinct culture of containerisation in the Gulf and one which poses pressing new questions about handling and lading methods, port infrastructures and labour organisation between the 2nd and 9th centuries. Unless torpedo jars were permanently installed within the ship's hull and filled in situ from smaller containers, lifting mechanisms must have been in regular use at both ends of a ship's route.

If proven, and again I stress that for the moment we only have one measurement of capacity for one surviving torpedo jar, such jars also appear to go against the basic principles of commercial containerisation seen in the later Islamic world and East Asia. What little data we have for the Islamic world comes from Ibrahim SHADDOD's (2016, 208) valuable study of jars through literary sources and it suggests that jars destined for the transportation of liquids such as wine, water or oil may have had capacities around 32 l, thus well within the average range of Roman amphorae and the later Thai jars discussed by Louise Cort, and all within human handling parameters. By contrast, Shaddoud notes that in the domestic context, the Islamic world preferred large immovable storage jars with some even permanently set into the ground or the building they served. The principle of super-sizing domestic storage vessels is also confirmed in BORELL's (2014, 292) analysis of later martaban jars where the very largest, around 200 to 400 l in capacity, were "stationary reservoirs" and used for water storage, both on land and at sea.

Why, when, where and how torpedo jars took on the sizes they did, and why they eventually disappeared are questions that will require far more research. What we can conclude already is that if cargoes continued to use ceramic containerisation, then our research needs to focus on the altogether more modest storage jar types. All ceramic jars represent a delicate negotiation between technical and material advantages and disadvantages. A critical concept in the discussion of transport in bulk is that of weight to capacity ratio, the ratio between the weight of an empty container and its volumetric capacity. The lighter the carrier when empty the more weight was taken up by the commodity or provision carried rather than by the container itself. With ceramics the sheer weight of empty jars – technically known as their tare – seems likely to produce a very poor weight to capacity ratio compared to other technologies of containerisation. Nevertheless, as the longterm success of amphorae in the Mediterranean show (BEVAN 2014), weight to capacity ratio is much less of an issue in water

transport – riverine or maritime – which is known to have been consistently cheaper than transport by land, and which required considerably less loading and off-loading during the course of a journey than was the case for land transport by cart or pack animal. Medium sized to small ceramic jars would have offered all the technical advantages of ceramic containment with greater ease of portability. At least for East Asia, the success of storage jars in maritime trade suggests that their advantages far outweighed any disadvantages. Kilns in Fujian province began producing storage jars during the Song and Yuan periods (QIN *et al.* 2017, 377) and, as Chinese ceramic technologies spread across East Asia, similar vessels began to be produced across the region, in Thailand, Vietnam, Cambodia and Burma amongst others. As WONG (2017) points out, Guangdong jars themselves continued to be produced and used in maritime trade into the 20th century and the same is true of many other vessels of this broad type.

The regional ceramic traditions which presently seem most suited to respond rapidly to volumetric approaches are precisely those of China and East Asia. Guangdong storage jars and the class as a whole present several important patterns that bode well for metrological approaches: notably survival in closely dated or datable contexts, and often in large numbers. This is an important pre-requisite, as FINKELSTEIN *et al.* (2011, 250) discusses for Mediterranean sampling, any estimate of metrological standardisation based on surviving vessels should ideally be based on "an assemblage that represents a short, 'closed' event," shipwrecks, they suggest, are perfect "laboratories" for this, presenting "a single day of loading cargo, a single port of origin, a single commodity or a single production center". As we have seen, a good range of dimensions are available for Guangdong jars recovered from the so-called Belitung wreck.

Like the "iconic" Roman amphorae of Mediterranean trade, storage jars have become something of a cypher for the Indian Ocean maritime trade, however, as the range of questions and problems just discussed underlines, no production can be read as a direct index of trade but must always be understood within a far broader landscape of containerisation and storage practice.

Soft containerisation: Sacks and bales

Ceramic assemblages from shipwrecks such as the Phnom Surin wreck (GUY 2017) as well as documentary evidence such as that provided by the Cairo Genizah (LAMBOURN 2018) make the point that ceramic containers were often secondary to a far broader range of ephemeral containers made from textiles, vegetal fibres and leather. This is not a new methodological observation as such, work on the quantification of the Roman economy has highlighted the void left in the archaeological record by, for example, the comparatively ephemeral

wooden barrel and the consequent “disappearance” from view of important sectors of regional economies such as the trade in salted fish out of Brittany (WILSON 2009, 234; on the Roman barrel see also BEVAN 2014). Yet it is a new observation for the Indian Ocean world where there are few dedicated studies of non-ceramic containerisation. While it is likely that waterskins, fibre sacks and baskets of various sizes were widely used, with sacks especially important in South Asia for bulk traded dry goods, unlike ceramics, ephemeral containers such as these only survive in exceptional conditions, either of extreme waterlogging or extreme dryness. So far few land sites or shipwrecks in the Indian Ocean area have been sufficiently waterlogged to preserve organic materials, although the Phanom Surin shipwreck in Thailand has recently been carbon dated thanks to the survival of amongst other materials rattan matting and rope (CONNAN *et al.* 2020, 1, n. 1). The Red Sea and Arabian Peninsula, however, offer both the necessary dryness to preserve organic materials, as well as having a well-established tradition of archaeology and have preserved fragments of textiles tentatively categorised as sacking material.

Much of the bulk trade in pepper and other spices out of India relied upon coarse sacks woven from bast fibres, the phloem or stem fibres of plants such as flax, jute, hemp, ramie and kenaf. At present there is no comprehensive history of the South Asian sack and its materials, although the technology is likely to be almost as old as weaving. Like coarse ceramic storage jars within the history of ceramics, sacks have been largely neglected in the study of textile arts. While an exhaustive search of Indian textual sources is much needed, the Tamil sources of the 2nd century CE are much cited. One describes armed donkey caravans transporting Malabari pepper to the port of Mamallapuram:

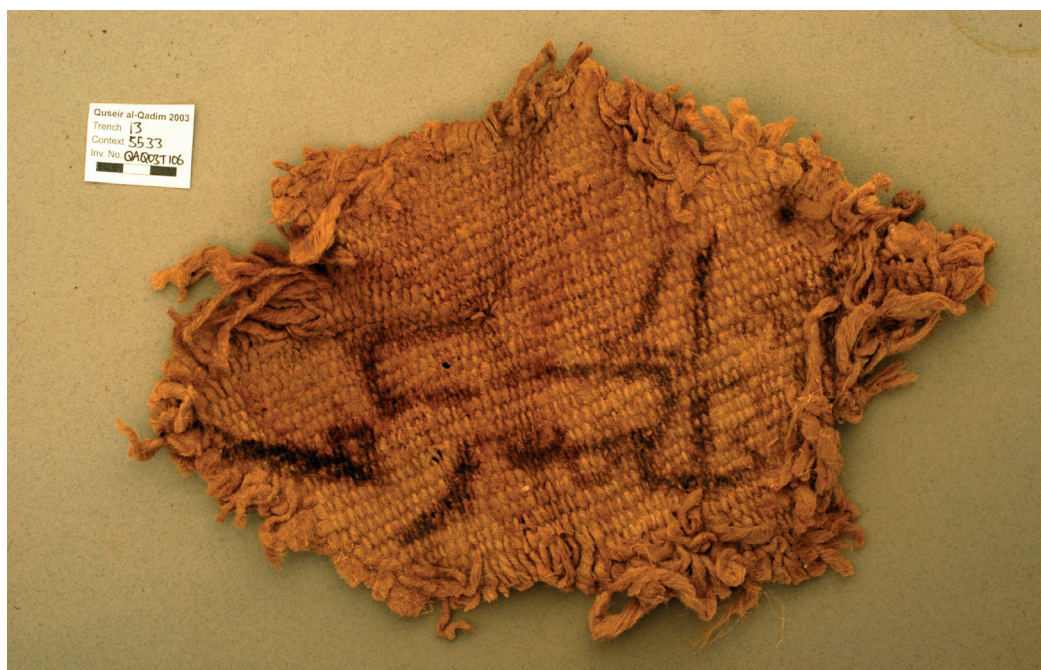
They travel of wide toll roads with their donkeys with lifted ears and backs with deep scars, that carry loads of pepper sacks, well balanced, resembling jackfruits with small segments that grow on the low trunks of curved trees (*Perumpānārrupatai*, cited in DE ROMANIS 2020, 123).

The poetic image vividly evokes the bulging pepper sacks hanging either side of the pack animals. Another Tamil poem, the *Purananuru*, describes sacks of pepper piled up at the port of Muziris, the principal port of Malabar involved in the pepper trade westwards to the Roman world. Donkeys may have been used in the first example because of the need for light-footed animals to cross the high mountain passes in the Ghats between Malabar and India's east coast ports. Other pack animals and human carriers were probably involved in Malabar itself, however, sacks continued to be the principal form of packing. In her study of textile finds from the Roman period Red Sea port of Berenike, Felicity Wild made the point that the fragments recov-

ered from the site's rubbish tips were so small, and multiply recycled, that their function was impossible to identify conclusively. One fragment of goat hair may represent the sewn corner of a sack, an important reminder that sacking was also used in the Roman world, particularly for grain and could be made from a wide variety of fibres (WILD 2002, 66). WILD (2002, 66) nevertheless does propose two Indian candidates, two fragments of Z-spun cotton which may represent the remains of Indian manufactured sacks or have been used for baling or covering merchandise.

Jute later became the signature sacking material of the sub-continent and its adoption by the medieval period is suggested by the identification of jute fibres in some of the earliest papers manufactured in western India around the 13th century. As papermaking relied on ready processed fibres such as rags, these fibres are believed to have been recycled from commercial sacking (KONISHI 2013, 26, 43). Several textile fragments found at the Red Sea port of Quseir al-Qadim in the Ayyubid period waste tips (ruled 1171-1260) (HANDLEY/REGOURD 2009, 143, 151) were identified as possible sacking material being woven of “coarsely woven bast fabric with a thick feel, making it rather inflexible but strong and hard wearing. This was the fabric typically used as sacking for bulky products” (HANDLEY/REGOURD 2009, 143). While some pieces are S-spun (Fig. 9) and thus likely of Middle Eastern manufacture, another two fragments (Fig. 10-11) are particularly interesting as they are woven from Z-spun fibres, a technique commonly associated with South Asian textile production. The simple ink writing on these examples, although illegible in two out of the three examples, nevertheless encourages their identification as sacking or baling since we know that merchants' names and sometimes delivery instructions were inked onto the outer wrappings of their consignments. Rare surviving letters from the world of Indian Ocean trade preserved in the Cairo Genizah (discussed in more detail shortly) regularly mention, for example, the practice of writing the name of the intended recipient on the wrappings of different items whether commercial cargo or personal items. One particularly clear example comes from a letter written around 1137-1140 to accompany a shipment sent from Aden to the Malabar coast and which concludes with the detail that six of the packages sent, one a canvas bag carrying copper, had the names of recipient and sender written on them “I wrote on each ‘Abraham Yiju shipment of Joseph’” (GOITEIN/FRIEDMAN 2008, 562).

The dominance of the South Asian sack is seen in the very root of the term adopted around the western Indian Ocean. The earliest consistent use of the term is in the correspondence of Jewish merchants in India during the 12th century, part of the Cairo Genizah material. The Judaeo-Arabic term used in the letters is *jūniya* (pl. *jawāni*), a relatively



◀ Fig. 9. Fragment of coarsely woven S-spun bast fabric from the Ayyubid period layers (1171-1260) at Quseir al-Qadim, Red Sea, typically used for sack-ing (03T106). 19 cm x 25 cm with inked writing (unread) (with permission of F. Handley, University of Southampton).



◀ Fig. 10. Fragment of coarse Z-spun bast fabric with two brown warp stripes, possibly sack-ing material. Recovered from the Ayyubid period layers (1171-1260) at Quseir al-Qadim, Red Sea (03T189). Perhaps South Asian, 32 cm x 27 cm, inked but inscription unread (with permission of F. Handley, University of Southampton).

► Fig. 11. Torn fragment of coarse Z-spun cotton inked with the name *Hasan b. cUmar*, possible remains of a sack or bale wrapping. Perhaps South Asian, 11 cm x 18.5 cm, recovered from the Ayyubid period layers (1171-1260) at Quseir al-Qadim, Red Sea (03T040) (with permission of F. Handley, University of Southampton).



uncommon term in Classical Arabic which is nevertheless widely found in Yemeni Arabic (PIAMEN-
TA 1990, 79) as well as in modern Gulf Arabic. It is now possible to recognise the term as an Indic loanword into Arabic and Judaeo-Arabic, from Sanskrit *gōnī*, probably via one or several regional languages, although the period of transmission has not been established, designating a loosely woven bag or sack. The term was well-established by the 12th century and Goitein and Friedman point to its occurrence in a set of published accounts from Ifriqiya, present-day Tunisia, as early as 1045-1046, indicating that this loanword had already disseminated with returning traders (GOITEIN 1973, 286). The term is also attested in the Yemen in the late 13th century customs documents from Aden published as the *Nūr al-Maʿārif* with reference to sacks of rice and wheat (NŪR AL-MAʿĀRIF

2003-2005, vol. 1, 512, 521). The importance of the Indian “sack” as a container of commodities is seen not only in the widespread adoption of this word in the mercantile Arabic of the western Indian Ocean in the medieval period but also in its later adoption into English as “gunny.” The term was current in the Colonial period (YULE/BURNELL 1903, 403) and continues in use among transport professionals and in Indian English to designate a sack (OXFORD ENGLISH DICTIONARY 2000, “gunny, *n.*”).

It goes without saying that sacking offered much better weight to capacity ratios than ceramic containers making it perfect for dry goods. That said, the paucity of surviving physical evidence means that we have no usable data on sack dimensions and capacities and are forced instead to rely on documentary sources alone to even approach the question. One of the most detailed set of

documents for the study of Indian Ocean packaging and metrologies is the corpus of so-called “India Book” documents from the Cairo Genizah. This documentary source has been known to the scholarly world since the 1950s when S. D. Goitein first identified and began to publish documentary materials from the so-called Cairo Genizah, some half a million manuscript and document fragments recovered from the *geniza* or ritual depository of the Ben Ezra synagogue in Cairo, and perhaps from other repositories too. Scholarly opinion now holds that several repositories likely contributed to this corpus although their places of origin in Cairo, and perhaps Syria, have not been determined. Of these fragments perhaps as many as 30,000 are documentary material rather than fragments of religious texts or manuscripts, and within that a very small portion, somewhere in the region of 500 fragments – we are not certain as the cataloguing of the Genizah is ongoing – pertain to the business dealings of Middle Eastern Jews in, and with, India, via the Red Sea. In 2008 the first volume of the “India Book” was published with Brill as *India Traders of the Middle Ages: Documents from the Cairo Geniza* (*‘India Book’*) (GOITEIN/FRIEDMAN 2008). The volume makes available in English translation over 170 documents as varied as business letters via calligraphy exercises to workshop chits. It is organised in three books, each centred around one key merchant figure. Thus, Book 1 gathers the documents relating to Joseph Lebdi; Book 2 focuses on Madmun b. Hasan-Japheth, the son of the Jewish Head of Merchants in Aden and later his successor; Book 3 focuses on the north African trader Abraham Ben Yiju. Goitein called these men “India traders” however they self-refer as a group as *tujjār* (Arabic plural of *tājir*) a term commonly translated as merchants. Certainly these men were merchants as the workshop seeks to define them, trading in bulk commodities and holding warehouses in both Aden and India. Hebrew editions of these documents, published this time with the all-important Judaeo-Arabic transcriptions of the documents, appeared in between 2009 and 2013 (GOITEIN/FRIEDMAN 2009; 2010a; 2010b; 2013). Since then Book 4, focusing on the “merchant scholar” Halfon, has been published although only in a Hebrew edition. Books 5, 6 and 7 of the “India Book” await publication (FRIEDMAN 2013).

The “India Book” documents are comparatively rich in references to packaging materials and textile containers, although by no means every commodity or traded item is listed with its container. Besides various types of bundle (*faysh/barkhas*) and textile or leather bags, sacks (*jūniyas*) are mentioned several times in the bulk transport of trade commodities out of northern Malabar, specifically cardamom and iron. They also feature in a list of luggage, in big and small sizes, transporting provisions of rice. *Jūniyas* are differentiated terminologically from bales (*‘idl*, pl. *‘dāl*) which are in fact

more commonly mentioned in the documents in relation to transactions along the route from Egypt to Aden and in western India. Along this route they feature in connection with the transportation of an extremely wide range of goods including lac, textiles, pepper, storax, beads, coral and other items (GOITEIN/FRIEDMAN 2008). Lest this seem a straightforward geographical difference of terminology between western and southern India, two sets of accounts written in Malabar also list bales, here termed *faysh*, as opposed to sacks, of cardamom, iron and pepper purchased there (GOITEIN/FRIEDMAN 2008, 642, 649). *Jūniya* and *‘idl* are not, it seems, interchangeable terms but correspond to two formally different technologies of containment, namely sacks that were, as now, sewn containers made by folding and closing cloth, and bales made from unsewn lengths of cloth and ropes that enclosed and bound the goods they carried. However, it is noticeable that in the “India Book” documents the term *jūniya* is associated principally with exchanges between Malabar and Aden and involves a far narrower range of goods. This difference might reflect simply different volumes of trade between the two areas. The bales of lac and textiles leaving western India, or made up in Aden, may have been composed of individual sacks or bags, which are simply not mentioned because it was the large outer container, the bale, that mattered; whereas sacks are visible in Malabar because they were rarely made up into large bales. The other possibility, that sacks were more commonly used in Malabar than in western India or Aden, seems unlikely given the evidence for this being an ancient and widely used technology.

Recordings of the size and weight of bales and sacks in the “India Book” documents suggest that it is very difficult to distinguish between the two technologies of containment on size alone. As Mordechai Akiva Friedman noted, while Goitein maintained that a bale was nominally 500 *ratl* or around 500 lb (GOITEIN/FRIEDMAN 2008, 190, n. 23) the reality is very different. This statement appears to be based on one letter written in Aden regarding bales of lac destined for Egypt: it records two bales of lac containing 1000 *ratl* or lb between them, in other words, bales of 500 lb each, and later refers to 60 bales of lac weighing 100 *bahārs* in total, with a *bahār* estimated at 300 *ratl* or lb, this again produces bales of exactly 500 lb (GOITEIN/FRIEDMAN 2008, 372, 374). Aden and the export trade to Egypt are exactly the place and route along which one might expect to see a standardisation of bale weights, particularly as this letter was penned by the son of Aden’s Head of Merchants, an individual one would expect to be attuned to standardisation. It is, however, the evidence of only one letter relating to one commodity, other correspondence shows a wide variation of bale weights: one of the sets of accounts written in Malabar mentions one bale carrying 8 *bahārs* of pepper, this would have

been a bale weighing roughly 2,400 lb (GOITEIN/FRIEDMAN 2008, 649); while elsewhere we find a reference to a bale weighing 380 *manns* or approximately 190 lb (GOITEIN/FRIEDMAN 2008, 187). The very flexibility of bales, able to include all manner of smaller packages as seen in examples here, would seem to discourage standardised weights except in very particular circumstances.

There is also comparably little evidence for standardisation of sack weights. The term is used less frequently but one of the most useful documents details the processing of goods received in Aden, that is the formal weighing of sacks in the Aden Custom's House (the *Furda*) and subsequent reception into local warehouses.

The sack of cardamom, delivered by Yaḡūt al-Tanjī at the sale in the house (*dār*) [a warehouse and bourse in Aden], turned out to weigh one *bahār* and 222 pounds, price 48 [dinars]; total 83 ½ dinars. The weight of the other sack was two *bahārs* less seven pounds, at a price of 45 [dinars], total 89 dinars (GOITEIN/FRIEDMAN 2008, 343).

With the *bahār* of Genizah documents estimated to comprise 300 lb or *ca.* 136 kg, this passage describes sacks of cardamom weighing just under two *bahārs* each, *i. e.* 522 lb and 593 lb respectively. While sacks as known from the early modern period onwards have been calibrated for manual handling, these “sacks” would have been too heavy and, in this case, simply too voluminous to have been moved without lifting equipment and the aid of pack animals or carts. The currency of consignments of this size is confirmed by later evidence from the port of Aden to the effect that large bales of spices were often too big to fit through the door of the customs building and had to be taken apart (VALLET 2010, 183). Madmun's *jūniyas* – each sack is discussed in the single – were thus more likely composites of several sacks and ultimately not far removed from bales. Even heavier sacks are listed in a set of accounts from the Malabar coast referring to the purchase of “six *bahārs* smooth iron in two *jūniyas*” (GOITEIN/FRIEDMAN 2008, 636). Each sack here would thus have weighed three *bahārs* or around 900 lb.

The evidence at present suggests little standardisation of bale or sack weights in western Indian Ocean trade, the exception being perhaps between Aden and Cairo. While standardisation such as this would have been beneficial to trade, it was by no means essential. In practice these forms of containment were not only light but highly adaptable, in a way that hard ceramic containers can never be, and they may have been so successful in trade precisely because of this. Taxes were often taken in kind along the route and here again, easily accessible forms of containment, would have facilitated this process. No “India Book” document gives us a complete packing history of one commodity's journey between India and Egypt, however, papers

from a court case held at the Rabbinical court in Fustat (Old Cairo) in the late 11th century provide unparalleled insights into the journey between Cairo and Aden and it is clear that packing, unpacking and repacking – with all the associated labour, materials, time and costs involved – was a fundamental part of inter-regional trade. One consignment comes into focus from its arrival at Qus, a port on the Nile from where goods from Cairo were transferred out of the ships transporting them and readied for camel transport across Egypt's Eastern Desert to the Red Sea ports. The defendant, Joseph Lebdi, describes how at Qus he purchased canvas, ropes and packing materials for the transport by camel of a consignment of storax, lichen, copper, textiles and thyme. His account indicates that these goods weighed in around 800 *Laythi ratls* (lb) in total and were carried by two camels (GOITEIN/FRIEDMAN 2008, 189). Each camel thus carried around 400 lb, we assume in the form of two 200 lb bales loaded on either side of the animal. At the Red Sea port of Aydhab, the defendant notes that he had to consolidate these four bales into two for the passage by ship to Aden, presumably two bales of 400 lb each. The sacking fragments retrieved from the slightly later Ayyubid layers at Quseir no doubt represent the remains of exactly this type of operation, as Handley and Regourd indicate. Interestingly, the court notes record Lebdi stating that the repacking in Aydhab returned the consignment to the original two bales “as it had been before” (GOITEIN/FRIEDMAN 2008, 190). In other words, bales for shipping, whether by river or by sea, were packed to 400 lb, bales for camel transport were half that. This bale weight is different from the 500 lb bales of lac discussed in the later document but it is currently unclear whether this is a sign of an evolving standardisation of bale weights, or simply represents an allowable variation.

Ultimately, the texts may be best explained through the prism of regional handling and transportation technologies – whether human or animal. The Arabic *bahār* is held to derive from Sanskrit *bhara*, “burden, load, weight,” the same root loanword of Persian *bār*, “package” or “bale,” but loads varied considerably according to the carrying system and the distance covered. Human portage appears to have been exceptionally important in Malabar where road systems were hard to maintain. Some of the best data was collated by Jean Deloche in his two volume *Transport and Communications in India prior to Steam Locomotion*. Taking into account both local lifting traditions and technologies as well as environmental factors, Deloche suggests that in south India the average loads carried on the head over long distances were in the region of 25 to 33 kg, the higher amount having been recorded among coolies working in the Mangalore area. However, over shorter distances and among professional porters the weight might double or even triple; Colonial period labour reports for

Bombay docks stipulate a maximum allowed load of just over 101 kg, while rice was packed in 1½ hundredweight (cwt) bags, equivalent to 76 kg (DELOCHE 1993-1994). Work on camel loads in northern India, by contrast, suggests that, depending on the animal and the difficulty of the route, camels were loaded between 148 and 247 kg. In the Roman Mediterranean a sack was one *artaba* calculated as equivalent to around 30.2 kg. A camel load was twice three *artaba*, 90 kg on each side or 180 kg in total (WILD 2002, 6).

While we may not be able to recover intact sacks or bales in the same way as ceramic containers, a multi-pronged approach as practiced by Jean Deloche, amongst others, that is combining ethnographic observation, understandings of human and animal physiology, ergonomics, and contemporary and historical material culture, can offer some hard data on ephemeral containerisation. A basket for carrying on the head can be no wider than human arms can stretch to hold it and no deeper than the length of the average forearm. A camel can only be loaded up to a certain weight. Waterskins represent a particularly fascinating negotiation between the size of the skin available, dependent on the species and age of the animal providing the leather, and the carrying capacity of the human or animal destined to transport or use it once the skin was filled. As these examples show, the figures are highly variable but nevertheless stay within clearly discernible boundaries. At 180 kg the Roman camel load sits within the 148 and 247 kg Indian loading of camels recorded by Jean Deloche. Similarly, at 25 to 33 kg, Deloche's average south Indian load for human portage correspond broadly to average Roman amphora capacities and to the average capacities identified by Ibrahim Shaddoud for commercial containers in the Islamic world. Anatomy and physiology, and a primitive form of ergonomics, shape many forms of containerisation and place clear constraints on human handling and portage, as on the lading of particular animals. The history of Indian Ocean trade needs to be more innovative in its approaches to the ephemeral or non-standard containers at its heart – whether as physical traces or, as I focus on here, through textual sources and ethnographic material – and the “rule-of-thumb measures” they present us with.

Conclusions – from capacities to historical metrologies?

Ceramic storage and transport jars provide reassuringly concrete evidence for trade, they are however, as this discussion has shown, far from perfect indexes and were only ever part of a broader landscape of containerisation and storage practice. Even as computer programs offer opportunities for ever more precise calculations of jar capacity, scholars need to continue to investigate the more ephem-

eral technologies of containment with which jars co-existed and the more ‘fuzzy’ estimates of volume and capacity that they generate. Cargoes were composed of both types of container and only a consideration of both will allow a better understanding, not only of economic history and the balance of trade flows, but of transportation logistics. A diversity of approaches to a diversity of source materials can only aid wider engagement with historical metrology and the important insights it generates. As Andrew BEVAN (2014, 387) concludes in his pioneering study of Mediterranean containerisation, we need “a more strongly comparative and evolutionary assessment of transport containers, as carefully designed, mass-produced, widely disseminated, and highly iconic objects”.

This data may in turn contribute to a better understanding of historical metrologies in the Indian Ocean area. Metrology and material culture have been enriching each other in the Mediterranean, and Mesopotamian, worlds for well-over a century even if, as MORENO *et al.* (2018, 412) notes, “approximations of ancient weights and measures have thus far mainly been approached from the theoretical analysis of classical literary sources [...] and not from experimentation, direct or digital”. The Indian Ocean is only just catching up with some of the critical measures – of capacity, amongst others – long since standardised in the Mediterranean but it should be clear from this discussion that storage jars from the Indian Ocean area offer important data to be tested against the larger body of abstract textual data that forms the mainstay of the field (for China, see for example CAO *et al.* 2012).

It is important to underline that it is not that historians of material culture or archaeologists working on the Indian Ocean do not measure things, or are fundamentally disinterested in measurement, simply that capacity measures have yet to enter standard practice and training. Recording measures of length is a standard part of museum accessioning and cataloguing procedure, of archaeological recording and of art historical description. Measuring in this way forms an important part of the documentation of the object under study and serves in part to counter the limitations inherent in the academic study of objects – namely that only a very limited number of people will ever have direct contact with the object itself. Through scale drawings, photographs and written descriptions including linear measurements, key aspects of the material object are communicated to readers. What we have forgotten perhaps, is that this produces a visual simulacrum of an absent object, but neglects the haptic aspects of an objects materiality, notably its heft, and in the case of containers, their heft both empty (the tare) and full. By forgetting to measure capacities and tares we also bypass important emic aspects of an object's manufacture and circulation, namely the historical units of measurement active at the time of its manufacture and use. It is

easy to miss this potential, the objects historians of material culture and archaeologists study rarely confront us directly with the units of measurement that might have shaped them. Surviving objects are rarely accompanied by any form of original textual documentation, let alone one including their measurements in historic systems, and objects described in texts are more likely to be described adjectivally, as simply “big,” “small” and so on, than to include precise measurements. It is perhaps not so surprising then that we rarely, if ever, consider the metrological systems that may have operated in the particular region and time of our object’s creation and use, and this in spite of the fact that we can often pinpoint to within a century the date of an object’s manufacture and also frequently have a good idea of the region, if not the exact city or settlement, where it was made. But if we did, there are so many questions to ask – do torpedo jars follow known Parthian and Sasanian volumetric capacities, what about TGW jars, and do Guangdong jars likewise match official Tang units? Where and when, if ever, did these different metrological systems meet, dialogue or even fuse? And to what extent were they themselves shaped by human and animal physiology and ergonomics?

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The movement of commodities in Bronze Age Europe

by ANTHONY HARDING

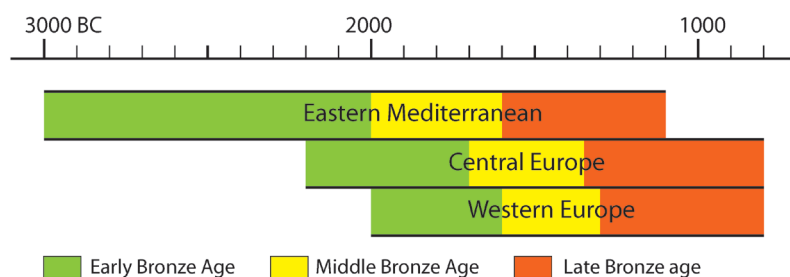
Bronze Age, transport, trade, Cypriot hook-tang weapons, salt

The evidence for wide-ranging connections in Bronze Age Europe is extensive, showing that widely separated areas of the continent were connected by networks of travel and trade. The article discusses the technology of travel in the Bronze Age, both overland and by water, paying particular attention to the evidence for boats that might have sailed around the Mediterranean, and beyond to Atlantic shores. Two case-studies are presented: the well-known hook-tang weapons of Cypriot type, whose distribution and numbers strongly suggest a genuine ancient movement; and salt, a very important commodity which, in spite of its invisibility in the archaeological record, must have been the subject of extensive movement from salt-rich to salt-poor areas. This applies especially to Romania, where recent experimental work has shown how large quantities can be obtained rather quickly using the so-called trough technique, in which fresh water is allowed to drip onto rock salt. Salt produced in these quantities was clearly a trade item, and can be regarded as having been commoditized.

Der Umlauf von Standardwaren während der Bronzezeit in Europa

Bronzezeit, Transport, Handel, „zyprische Speerspitzen“, Salz

Die Hinweise für weitreichende Verbindungen im Europa der Bronzezeit sind umfangreich und zeigen, dass weit voneinander getrennte Gebiete des Kontinents durch Reise- und Handelsnetze miteinander verbunden waren. In dem Beitrag wird die Technologie des Reisens in der Bronzezeit diskutiert, sowohl was den Transport über Land als auch über Wasser betrifft, wobei besonderes Augenmerk auf die Hinweise zu Booten gelegt wird, die um das Mittelmeer herum und darüber hinaus bis zur Atlantikküste gesegelt sein könnten. Es werden zwei Fallstudien vorgestellt: eine zu den bekannten sogenannten zyprischen Speerspitzen („Cypriot hook-tang weapons“), deren Verbreitung und Anzahl stark auf eine echte Mobilität während dieser Zeit hindeuten, und eine weitere zu Salz, das eine sehr wichtige Ware darstellte. Trotz der Unsichtbarkeit von Salz in den archäologischen Quellen muss es in umfangreichem Maße von salzreichen zu salzarmen Gebieten transportiert worden sein. Dies gilt insbesondere für Rumänien, wo experimentelle Arbeiten jüngst gezeigt haben, wie mit der sogenannten Trogtechnik, bei der Süßwasser auf Steinsalz tropft, relativ schnell große Mengen Salz gewonnen werden können. Das in großem Stil produzierte Salz war eindeutig ein Handelsartikel und wurde während dieser Epoche zu einem Standardprodukt („commodity“).



▲ Fig. 1. Generalised timechart of Bronze Age periods in the areas discussed in this article.

It has become a truism that Bronze Age Europe was a highly interconnected world, with travellers moving over long distances, from one end of the continent to the other. As well as these travelling people, it has long been known that raw materials and finished goods must have been moved about, since there are limited sources of metal ores and other resources such as amber. This much is obvious. But achieving an understanding of how such movement took place in the prehistoric world of Bronze Age Europe is another matter altogether. In this contribution I shall consider some of the technical challenges that faced trade and exchange in the Bronze Age, and look at a couple of case studies of different kinds that relate to our understanding of travel and trade in the period. The timeframe and geographical space considered here are both broad; Fig. 1 provides a concise diagram of the centuries in question.

The technology of travel and trade

Travel and trade over land or water require various means of facilitating such activities (general discussion: BOROFFKA 2018; NESSEL *et al.* 2018; NESSEL/UHNÉR 2018). It is hard for us in the 3rd millennium AD to comprehend what this must have meant to people in the 2nd millennium BC (or any period prior to the construction of a systematic road network, which in Europe usually means the Roman period). While there was plenty of deforested land in the Bronze Age, and routes across the continent probably followed river valleys and areas such as chalk hills with light soils, there were no long-distance paved roads and rivers were untamed – no weirs, probably no stone bridges (the only evidence we have is of wooden pile constructions), numerous shallows and rapids which would have made continuous navigation difficult, and meandering river courses which will have greatly extended the notional distances to be covered. Sea travel has always been uncertain, even in modern times; obviously more so in ancient ones. Yet in spite of these multifold difficulties, it is clear that they were overcome and both people and goods travelled over long and short distances.

Land travel

The simplest form of travel is on foot – shanks's pony, in the old Scottish formulation. Walking requires minimal technology, other than a reasonably clear path and footgear strong enough to avoid damage to the feet (though Bronze Age people were undoubtedly much more accustomed to rough-shod or barefoot walking than we are). Paths and roads do not survive from this period, other than as wooden trackways across wet or boggy ground, or as short stretches of cobbles. Attempts at reconstructing routeways, as was attempted by ERNST SPROCKHOFF (1930, 145 pl. 45), typically depend on the distribution of bronze finds along river valleys; a recent discussion centres on wooden trackways in north-west Germany as routes (BURMEISTER 2018). In truth, it is impossible to do more than speculate about how and where people went on foot, other than to assume that only the most inaccessible topography and vegetation were beyond physical limits (which of course are not the same as cultural limits).

In such circumstances, the technology of carrying goods may be very simple.¹ Many types of carrying equipment, ranging from simple woven squares to more elaborate backpacks, are known ethnographically (FENTON *et al.* 1973); Ötzi the Iceman, as much as 2000 years before, had a wooden backpack (EGG 1992; SPINDLER 1994, 91-93; SPINDLER *et al.* 1995; EGG/SPINDLER 2009),² while a well-preserved leather backpack was found in the Bronze Age part of the Hallstatt salt mine (KERN *et al.* 2009). One may presume that such items were commonplace in prehistory. For a commodity such as amber, a simple backpack would be all that is needed, since it is light and most known pieces are quite small. For other materials, such as metals (in whatever form), containers must have been larger and the method of transport correspondingly better suited to heavy loads. Pack animals are the most obvious solution, but for this suitable paths or tracks are needed. The same would be true for sledges and slide-cars, simple but effective means of carrying loads across relatively even ground. It is surely telling that sledge runners have been found in a few graves (HARDING 2000, 101, 120-121 with references).

The next step was to use wheeled vehicles, which first came into use in Europe in the Copper Age (PIGGOTT 1983). The first wheels were solid, usually tripartite, and very heavy (VAN DER WAALS 1964). The carts to which they belonged must have been extremely heavy and cumbersome; it is impossible to imagine that they were

¹ "Man's oldest beast of burden was woman" (COLE 1954, 705), a sentiment that would hardly be permissible today. To be fair, this statement was made by a female scholar and followed by the rider "on the more or less justifiable plea that the male had to be unencumbered, to protect his family".

² Though other explanations have been advanced for the structure found: TERŽAN 1994.

used for transporting heavy goods across long distances. The clay model wagons found in central Europe and belonging to the Copper and Early Bronze Age indicate what such vehicles must have looked like (BÓNA 1960; BOROFFKA 2004). Only with the invention and development of the spoked wheel (or variants such as the cross-bar wheel) would vehicles have become light enough for anything other than short journeys; and even then some kind of prepared ground in the form of solid surface would have been necessary. Isolated finds of full-size cross-bar wheels in wood have been made, as at Mercurago in Italy (CROUWEL 2012, 82 pl. 84-85). Model spoked wheels occur on various sites in central Europe and are seen in rock art and other media (PARE 2004), but it is unclear what their function was; no model vehicle with such miniature wheels has been found, with the exception of the “cult wagon” from Dupljaja in Serbia (GARAŠANIN 1951; BOŠKOVIĆ 1959; PARE 1989). By the Late Bronze Age, however, a number of vehicles with elaborate spoked wheels are present, and while the surviving examples in bronze probably had a special function (*e. g.* the “cult wagon” from Acholshausen, Ldkr. Würzburg), it must surely be the case that more mundane vehicles in wood were widespread. It is surely these that would have been used for longer distance transport.

Solid wheels with lunate openings of the Late Bronze Age found at Must Farm and Flag Fen, Cambridgeshire, dendro-dated to 1300 BC (<https://www.cam.ac.uk/research/news/most-complete-bronze-age-wheel-to-date-found-at-must-farm-near-peterborough>, accessed 04.12.2019), indicate that the technology was spreading widely across the continent by the Late Bronze Age. Taken all in all, it seems most likely that cross-continent transport was either riverine or else by means of pack animals rather than by wheeled vehicles; even light vehicles with spoked wheels would only have been suitable for travel across partially prepared terrain that was reasonably dry.

Water transport

In Egypt, the East Mediterranean and the Aegean, numerous depictions (and in Egypt actual vessels) indicate what boats were like (GRAY 1974; WACHSMANN 1998; WARD 2000; 2004); surviving examples, such as that from Uluburun, suggest boats up to 25 m in length, rowed and/or sailed.³ Such vessels sailed the length and breadth of the Mediterranean, probably into the Black Sea and very likely round the Iberian peninsula (though there are no physical remains to prove this). In Europe generally, the standard vessel in prehistory was the log canoe (MCGRAIL 1978; ARNOLD

1995-1996; MOWAT 1996), which would be suitable for river transport and perhaps sea travel on a calm day near the shore. It is hard to imagine such boats being used for travel in the Atlantic or the North Sea. In northern Europe, there is a rich corpus of depictions in Scandinavia (KAUL 1998; GOLDBAHN/LING 2013) but no finds of boats *in corpore*. There has been much speculation about the nature of these boats; clearly some of them were of considerable size, with up to a score of paddlers. Given the nature of the coastline and lake landscapes of Sweden and Norway, they must have been used extensively for near-shore sailing, but it remains uncertain how far they might venture onto the open sea.

Much the same may be said for the sewn plank boats of England and Wales (MCGRAIL 1987; WRIGHT 1990). Some observers have doubted whether such boats could have crossed the English Channel, let alone the North Sea or the Bay of Biscay; the finding of a large example on the seashore at Dover (CLARK 2004) seems to put it beyond doubt that they were used for crossing at least the 35 km from Dover to Cap Gris-Nez, arguably the longer distances from more westerly harbours such as Portsmouth, Christchurch, Poole, Plymouth or Falmouth to the French coast: a cleat from a plank boat comes from Testwood Lakes on the river Test behind Southampton (FITZPATRICK *et al.* 1996), while Mount Batten, overlooking Plymouth harbour, is suspected of having been a landing place for cross-channel trade (CUNLIFFE 1988). Given the finding of presumptive cargoes of Bronze Age bronzes off the south coast of England (NEEDHAM *et al.* 2013), it is quite clear that cross-channel trade was regular and perhaps frequent.

The upshot of this is that it remains uncertain by what route or routes, commodities or individual artefacts might have travelled from the Mediterranean to northern Europe. Either boats must have sailed round Iberia and France, or the routes went through the centre of the continent. As far as central Europe is concerned, it is likely that travellers followed predominantly riverine routes (Danube, Rhône), or the sea route to the Caput Adriae, and thence overland across the Alps over one of the Alpine passes (*e. g.* the Brenner to the Inn valley), or from Monfalcone up the Isonzo/Soča, then eastwards along the Vipava valley to Postojna, from where it is a fairly easy route across the hills to the Sava. Access to the eastern side of the Adriatic is harder; from coastal Albania one may reach a certain amount of low-lying land, but beyond that towering mountains make inland penetration difficult – as is the situation in western Greece, Montenegro, and coastal Croatia. Access to inland south-east Europe is easier from the Vardar-Axios-Morava or Strymon-Struma-Djerman valleys, or from the Black Sea rivers. It is with topographical background that we may consider the movement of goods in Bronze Age Europe.

3 The Uluburun vessel is often called a ship, but a retired merchant navy captain of my acquaintance insists that a “ship” must have lifeboats; otherwise it is a “boat”. It is estimated to have been 15-16 m long (PULAK 2005).

Commodities and transport

There is clearly a big difference in the size and weight of the commodities that were moved around Bronze Age Europe. While beads of amber or glass could have been transported in bulk by human carriers, metal, especially in ingot form, was heavy and would have required vessels, vehicles or animals. Thus our approach to the technology of interconnection must bear in mind the costs (in skill and labour) of producing the requisite tools for the task. Isolated objects like the Dohnsen cup (SPROCKHOFF 1961; MATTHÄUS 1977-1978) or the Balkakra drum (KNAPE/NORDSTRÖM 1994), while interesting as part of a bigger picture of north-south contacts in the Bronze Age, tell us rather little about the regular movement of commodities. While the former has often been kept out of the discussion because of its lack of good find context, the latter is fully documented and can only realistically be understood as some kind of prestige gift or high value acquisition during a foreign journey. It has little or nothing to tell us about any more routine exchange mechanism. Other objects, while probably not part of a routine exchange, are not unikates, and have a different story to tell. Such is the case with a well-known class of objects: the hook-tang weapons of Cypriot type. I shall consider these briefly, before moving on to a quite different material: salt.

Cypriot spearheads

A class of material which has long been enigmatic is that of the so-called Cypriot daggers or spearheads (more correctly, hook-tang weapons, German *Griffangelklingen*) (REINECKE 1933; CATLING 1964, 56-59 fig. 1-2, 111-112 fig. 12, 118 fig. 13; GERLOFF 1975; GALLAY 1988, 167-171; most recently systematic discussion of all finds, with references, in BRANDHERM 2000; 2017).⁴ These items, which in Cyprus come in several forms and have a rather long life, have been considered by some to be collectors' items, of no value as a guide to an understanding of cross-continent interactions (WATKINS 1976); by others, as true indicators of contact between the East Mediterranean and the continent of Europe more widely (GERLOFF 1975, 149-152, 255-257; and now BRANDHERM 2017). Other authors decline to commit themselves (GALLAY 1988). The largest number of finds by far come from France, almost entirely without context and in several cases without a known findspot; though this may be considered suspicious, the sheer number, with its predominantly Atlantic and riverine distribution, is telling. Only the group allegedly from Csorvás in eastern Hungary, known to emanate from the antiquities trade, is truly unlikely to

come from its stated findspot. New finds have continued to come to attention, however, for instance that allegedly from Torrington in north Devon (BRANIGAN 1983) (Fig. 2 right) and a "hoard" of five more found in the East Devon town of Sidmouth (PEARCE 1983, 551 pl. 117); another came from the island of Bute near Glasgow in western Scotland (BRANDHERM 2000, 54 fig. 4c, 64 no. 24) (Fig. 2 centre). These pieces join the one from Egton Moor in North Yorkshire, also without context (Fig. 2 left).⁵ My own position has moved from doubt (HARDING 1984, 171-172) to a belief that the appearance of so many such items appearing in different parts of Europe must be more than coincidence. What then can they tell us about contact and transport across the continent?

First one must consider the possibility that these weapons were actually used by warriors and taken with them to distant lands. One might find such an explanation more believable if they ever appeared in graves or merely in find contexts that indicated genuine association with the local Bronze Age; the only possible such example is that from Dricourt, Ardennes (GERLOFF 1975, 256 no. 13; GALLAY 1988, 169-170, no. 1627, Taf. 54), found in a tumulus (but not certainly in a grave). Otherwise this is not the case. There are a few instances of Aegean weapons in graves north of Greece (KILIAN-DIRLMEIER 1993; HARDING 1995, 20-23), and weapons that appear to imitate Cypriot forms in Sardinia (LO SCHIAVO 1980), but that is hardly sufficient to act as validation for these pieces as warrior equipment carried on campaigns. We may reject this possibility.

That leaves other motives and means for the appearance of the bronzes across Europe. While realistically there is too little material, and with too poor a find record, for anything to be said with certainty, one may speculate that the form possessed a particular authority in the eyes of its makers and users – and more especially of those in far-off lands who saw them – so that they became sought-after items of special interest and value. Some became part of collections (hoards), though never with local bronzes; the hoard from Plouguerneau, Finistère, for instance, also contains two flat axes and two flesh-hooks which are not local in form and are probably also Cypriot. Others found their way into the ground (or water in the case of the piece from the river Zihl in Switzerland) as single objects. None has ever appeared

⁴ CATLING (1964) refers to the Early and Middle Bronze Age weapons as daggers or "rat-tail weapons", but to the Late Bronze Age pieces as spearheads.

⁵ A note (undated) with this object was seen in Whitby Museum in 1976, stating that an "identical dagger" had been found in the Bradford area "the previous year", and was now in "Bradford Museum". Dr Gearóid Mac a' Ghobhainn, Collections Manager of Bradford Museums and Galleries, has kindly checked and states that there is no record of such a find in their collections (email, 17 December 2019). I am grateful to Mr Terry Manby for the suggestion that the "identical dagger" was in fact a tanged knife from Baildon Moor; and for the observation that the patina on the Egton Moor weapon is atypical for bronzes from the North Yorkshire Moors.



◀ Fig. 2. Hook-tang weapons (“Cypriot spearheads”) from Britain (not to scale). Left: Egton Moor, North Yorkshire (Whitby Museum; photo courtesy of R. Pickles), length 37.3 cm; centre: Rubha a’ Bhodaich, Bute, Argyll (Kelvingrove Art Gallery and Museum, Glasgow; photo courtesy of Dr D. Brandherm), length 26.2 cm; right: Torrington, Devon (Royal Albert Memorial Museum, Exeter; photo by RAMM, by permission), length 38.5 cm.

in any of the thousands of “normal” Bronze Age hoards from across Europe – which in itself is a remarkable fact. Clearly whatever their significance and function in Europe, it was different from the usual way of treating bronze.

The finds from Britain and France would suggest a maritime movement (Fig. 3); the main exception is the hoard of pieces allegedly from Csorvás, Hungary. These have a very uncertain history, having been bought from an antiquities dealer, but there is no other reason to suppose that they are a modern import into central Europe from the Mediterranean (*pace* Reinecke and Watkins). There are in fact four potential hoards of

the weapons, two from France, the one from Hungary, and the supposed hoard from Sidmouth, Devon (with no context or known history, and not available for study).⁶ Whether there is a significance in the finding as groups is unclear, but it seems possible. This would add to the likelihood that they had a special meaning in areas outside their place of origin. This idea is supported by BRANDHERM (2017, 60).

⁶ The pieces were seen by Prof. Susan Pearce in a shed in Sidmouth, Devon, in the 1970s but there is no further information available and their present whereabouts is unknown. They are not in the local museum in Sidmouth, nor are they in the Royal Albert Memorial Museum in Exeter.



▲ Fig. 3. Distribution of Cypriot hook-tang weapons in Europe (Cyprus not shown), after Gally and Brandherm. The larger points indicate multiple finds (hoards). Note that the find from Csorvás, Hungary, came from the antiquities trade and the alleged findspot is unreliable.

A mainly maritime route (or riverine in the case of Hungary) would complement other evidence for far-reaching connections by sea from the Mediterranean to north-west Europe, for instance the Sicilian items in metalwork from the Netherlands and southern England: the Sicilian razor in the Ommerschans hoard, the special object in the finds from the sea off Salcombe (BUTLER/BAKKER 1961; NEEDHAM/GIARDINO 2008). BRANDHERM'S (2000, 58 Abb. 7) full discussion and map show how a significant number of finds, including those he has identified in Spain, are close to coasts. Such a scenario would suggest that seagoing vessels plied the waters not only right across the Mediterranean (as is clear from the distribution of Mycenaean pottery), but also rounded the southern cape of Spain and proceeded northwards round the coasts of Portugal, northern Spain and France. Such a picture has long been suggested, but there are too many "missing links" for certainty.

Cypriot material spread widely around the northern shores of the Mediterranean in the Bronze Age, not only in Greece (CATLING 1964) but also in the central Mediterranean (LO SCHIAVO *et al.* 1985) and potentially further. This is in addition to the movement of Cypriot copper to Greece and other areas. Material on the Uluburun boat included much from Cyprus, quite apart from its copper ingots; Cyprus was clearly one of its recent, perhaps its most recent, port of call.

Whatever the truth of the matter, it seems time to re-integrate the hook-tang weapons into the picture of trans-continent movement in the 2nd millennium BC, joining that for the movement of metals (copper, gold, tin) (LING *et al.* 2013; 2014; BORG/PERNICKA 2017) and glassy materials (VARBERG *et al.* 2015; 2016). How they might have moved is less of a problem than with metals. While they are not small and light like beads, neither are they bulky and heavy. It seems unlikely that they were items of regular weight that could



◀ Fig. 4. The hollows created in the surface of rock salt by allowing fresh water to drip from a wooden trough (photo by D. Buzea).

have had a defined value in an exchange mechanism, as has been suggested for a range of other bronze types, notably sickles (SOMMERFELD 1994); it is much more likely that their value was social rather than economic.

Salt

Much has been written about salt in recent years (review in HARDING 2013), with many new sites and finds being discovered and excavated. Unfortunately, however, no progress has been made with the most crucial and important aspect of salt archaeology: its movement as a trade item. It is well known that salt is important for human and animal health and has a wide range of other uses, notably for the preservation of foodstuffs. Add to this the fact that some parts of the world are rich in salt sources and others have none, and the stage is set for a dynamic picture of trade and exchange, potentially over considerable distances.

Salt may be mined, as at Hallstatt, produced by evaporation in coarse ceramic containers (briquetage), or extracted on the surface by quarrying or open-casting, using picks, hammers or the so-called “trough technique”. Whichever way was favoured or possible, the end product was crystalline salt in small or large lumps, wet or dry. In order for it to be moved to the consumer, it must have been packed into containers or pressed into blocks that could be held in place by cords or ropes, to be transported by boat or on the backs of pack animals. Nothing of this survives. Ideally one would wish to use chemical or isotopic characterisation techniques to identify salt from particular sources, and to follow that salt present as residues on pot-

tery or bone; but because salt is so soluble this has so far proved impossible.⁷ As a consequence one is forced to use purely archaeological methods, based on site distribution, in order to suggest how individual cultures or communities obtained their salt.

Salt is a material which could well have been weighed and transported in fixed amounts, even though we do not know how it was packaged. Clay vessels of specified volume might have been all that was necessary for the purpose; it is possible that such vessels are already present in the archaeological record but not identified as such.

Experiments by D. BUZEA (2013; 2018) in Romania have shed much light on these matters. At the site of Băile Figa near Beclean, in northern Transylvania, a series of wooden troughs have been found, similar to others found in previous decades at other sites. Although the exact function of these troughs is not known for sure, one method for which they can be used is to drip fresh water onto a rock salt surface. Over a period of a few hours this creates hollows in the rock (Fig. 4), after which the salt crystals can be easily broken into small pieces and collected up. BUZEA (2018, 44) and his colleagues were able to collect up 50 kg in 30 minutes by this method, using a variety of simple stone pounders, and placing the rock in a simple wooden bucket (Fig. 5-6). This is a very considerable quantity, far in excess of what contemporary working using briquetage can have been capable of; in addition, by far the most time-consuming and laborious part of the work was obtaining and cutting the timber

⁷ Through the kindness of Drs Jens Andersen (Cambridge School of Mines) and Zachary Sharp (Albuquerque) I have been able to test some of the possibilities, using ICP-MS, EPMA (electron microprobe), and chlorine isotope analysis, but the results have not justified further work.

► Fig. 5. Collecting lumps of rock salt from the area where hollows had been created (photo by D. Buzea).



for the task, not the process of producing the salt. Once the trough was made (and these would have been likely to have had a long life, only requiring new troughs at infrequent intervals), it was mainly channelled pieces that were needed to bring the fresh water onto location, but after that no great effort was needed until the salt was collected.

Baskets or buckets such as those shown would have been easily made, and would have served not only for storage but also for transportation. A bucket of this sort made of conifer wood weighs some 700 g; filled with rock salt it weighs 5.0–5.5 kg. For transporting the rock over any distance a bag or sack is needed; in this reconstruction a sack was made of modern materials and was capable of carrying 20–25 kg slung over the shoulder. Two such sacks could have carried the 50 kg mentioned above. Such weights are far in excess of anything that has so far been identified in studies of weights and measures in Bronze Age Europe, where “heavy weights” are those up to 200 g (RAHMSTORF 2010; 2019; IALONGO 2018; IALONGO/RAHMSTORF 2019; a heavier quantum at 433 g is regarded as more problematical). One might presume that a bucket of this size and shape itself served as a measure of mined material, in this case salt, but conceivably also for ores (especially copper). In the absence of further archaeological information, these matters remain speculative.

The Bronze Age salt trade

One of the most important aspects of ancient salt, however, is that it must have served as a major trade item, since not everywhere has its own sources. This applies particularly to inland areas; coastal areas could have exploited seawater, using the briquetage technique. Although northern and

north-western coasts of Europe might be considered too cold and damp for such a technology to be appropriate, this was not in fact the case: Atlantic and North Sea shores contain abundant evidence for this technique having been used in later prehistoric and Roman times. Even Ireland, which otherwise has only one major salt source, on the Antrim coast, has been shown to have boiled seawater in medieval and modern times.⁸

In the context of the salt of Transylvania, the most obvious salt-less area is Hungary. Present-day Hungary has no salt sources (in contrast to imperial Hungary, which encompassed parts of most of the surrounding countries, rich in salt). This is obviously important given the numerous large tell sites present above all on the Great Hungarian Plain, but also to the west of the Danube, for instance at Százhalombatta or the Benta valley, (VICZE *et al.* 2005; EARLE/KOLB 2010). But both to the west (the Alps) and to the east (Transylvania and Moldavia, in present-day Romania) there are rich deposits, available for mining or for exploitation in brine form. A lucky find of crystalline salt from a Late Bronze Age site at Lébény in

⁸ Medieval records indicate that salt was an important commodity, obtained from salt pans around the coasts (Anon, *Salt in Ancient Ireland* 2013, <http://atriptoirreland.com/2013/10/16/salt-in-ancient-ireland/>, accessed 09.12.2019). Apart from the fact that this shows how sea salt can be obtained even in cool moist climates like that of Ireland, it indicates that salt was moved about, though not in what form or in what containers. In recent years interest in salt archaeology has increased in Ireland, with a National Survey producing a portfolio “The Archaeology of Salt Production in Ireland” (<https://saltarch.wordpress.com/the-national-survey/>). This has confirmed that coastal salt production was a regular practice in modern and probably early modern times, with a presumption that the procedures could have gone far back in time.



◀ Fig. 6. Tools used in breaking up the rock salt, and wooden buckets full of salt pieces (photo by D. Buzea).

western Hungary (NÉMETH 2011; 2013) would suggest an Alpine origin, since the findspot lies some 350 km from Hallstatt (to the Transylvanian sources twice as far). But the great tells sites east of the Danube would rather look eastwards to the sources of Transylvania, just as sites in inland Ukraine and south Russia might have looked westwards to those of Moldavia. Since at present it is impossible to use characterisation techniques to identify which source supplied which site or sites, it is necessary to rely on historical and archaeological evidence, and make assumptions about the movement.

There is an extensive record of the medieval and early modern movement of goods around the Carpatho-Danubian zone, including the movement of salt (esp. MARC 2006; the evidence summarised in HARDING/KAVRUK 2013, 212-217). All the major rivers were used, with rafting often being the favoured method. The main pressure points were the gorges through the Carpathian massif, especially between Transylvania and Moldavia; but since both provinces are rich in salt, trade in salt through these points was probably not necessary anyway. Salt was mostly transported in block form, or as smaller pieces or lumps; there are no certain indications of the transport of brine. In any case, it would be much easier to evaporate brine into crystalline form and pack it into parcels than to attempt the movement of salt in liquid form.

In France, too, while there are a number of prolific salt deposits, especially in the east of the country, there are large parts without either rock salt or brine sources. Near Atlantic and Channel coasts, there is abundant evidence for production by evaporation using briquetage (or lagoons where

solar evaporation was possible). But in much of the interior of the country there is little or no salt, which means that it had to be moved to satisfy the biological needs of those who lived there. As in Britain, the presence of coarse ceramics far from the coast presumably indicates that salt was moved around in specific clay containers.

Salt as a commodity

Like other materials obtained from the ground, or the environment, salt has no intrinsic value until it is recognised and exploited as a useful material. A lump of rock salt might just as well be a pebble on the beach until its useful properties for humans (and by extension animals) are brought into play. The process of turning a material into a commodity is both economic and social, since value can only be created within a social framework. In practice, it appears that salt was sought after from at least the Mesolithic, probably much earlier, as its properties came to be understood.

Apart from assigning value to salt, there is a question of scale. Communities utilising a local salt spring or rock outcrop for purely domestic purposes have not commoditized it; it is a resource which is used for home consumption, but not an object of value recognised beyond the local milieu. Such was the situation in much early production, where output must have been very small (for instance with the first briquetage as found in southern Poland or in Romanian Moldavia). Producing salt by evaporation using briquetage is a lengthy process, and in Neolithic and Bronze Age contexts, the volumes seem to have been small (to judge from the size and scale of sites and the surviving briquetage). It seems likely that this salt was for local, domestic, consumption.

Things changed when the volumes produced were significantly higher, so that the product could be passed on to other communities, near or far. Such was the situation in Romania with the invention of the so-called trough technique, which as described above enabled much greater quantities to be produced. The same situation applies to the massive briquetage-based operations in Lorraine in the Iron Age (OLIVIER 2012; 2015). Estimating quantities is probably impossible, but the volume of briquetage speaks for itself. In these cases, the salt can only have been intended for exchange beyond the local area, in other words it had become a trade good. These were contexts where one can truly describe salt as a commodity, one that had value (however expressed), and exchanged according to the system of values in use at the time. In this context, one may wonder whether the volumes of salt might have followed weight systems as present in much of Europe (RAHMSTORF 2010; 2016). As discussed above, this is beyond our present ability to tell since most of the identified weight quanta are relatively small.

Conclusion

The two case studies presented here are quite different in nature: one concerns rare objects that must have passed along networks of exchange involving person to person contact, and ending up in distant lands as prestige objects. The other concerns an everyday commodity which was an essential item of dietary consumption and needed also for domestic and industrial processes; it must have been moved in rather large quantities over well-established routes. One became a commodity; the other was a (relative) rarity. One is likely to have been moved by individual travellers, the other by caravans of pack animals or watercraft. The two materials are so different that no unified story can be told about them. Yet both have a contribution to make to the overall picture of trade and travel in Europe in the Bronze Age.

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Marcus Laelius Cosmus

Italian merchants and Roman trade at Berenike under the Julio-Claudian emperors

by RODNEY AST

Berenike, Temple of Isis, Red Sea trade, Roman merchants, Puteoli, aromatics

The article examines the role of Italian merchants and their local representatives in maritime trade between the Mediterranean and South Arabia, East Africa, and India in the early to mid 1st century AD. The analysis is based on previously unpublished epigraphic evidence from the Temple of Isis at the Red Sea port of Berenike. These finds show that a Roman merchant probably from Puteoli named Marcus Laelius Cosmus was a prominent trader with operations in the Red Sea and Indian Ocean regions. Not only was he financing trade, he also did much to adorn the port of Berenike. Not least, he was responsible for (re)building the port's central Isis Temple during the reign of the emperor Tiberius (AD 14-37). He, or someone within his social or familial network, might also have been the origin for the association of a man called Cosmus with the perfumer by that name who appears as a stock figure in the epigrams of the Roman poet Martial (ca. AD 38-104). The central role of Berenike in the importation of aromatics used in perfumes makes this association plausible, although it remains unproven.

Marcus Laelius Cosmus.

Italische Händler und römischer Handel in Berenike unter den julisch-claudischen Kaisern

Berenike, Isis-Tempel, Handel im Roten Meer, römische Händler, Puteoli, Aromastoffe

Der Artikel untersucht die Rolle der italischen Kaufleute und ihrer lokalen Repräsentanten im Seehandel zwischen dem Mittelmeer und Südarabien, Ostafrika und Indien vom Beginn bis zur Mitte des ersten Jahrhunderts n. Chr. Die Analyse basiert auf bisher unveröffentlichten epigraphischen Zeugnissen aus dem Isis-Tempel im Hafen von Berenike am Roten Meer. Diese Funde zeigen, dass ein wahrscheinlich aus Puteoli stammender römischer Kaufmann namens Marcus Laelius Cosmus ein prominenter Händler war, der im Roten Meer und im Indischen Ozean tätig war. Er finanzierte nicht nur Handelsaktivitäten, er setzte sich auch für die Verschönerung des Hafens von Berenike ein. Nicht zuletzt war er während der Herrschaft des Kaisers Tiberius (14-37 n. Chr.) für den (Wiederauf-)Bau des zentralen Isis-Tempels des Hafens verantwortlich. Er oder jemand innerhalb seines sozialen oder familiären Netzwerks könnte auch der Ursprung für die Verbindung eines Mannes namens Cosmus mit dem Parfümeur dieses Namens gewesen sein, der in den Epigrammen des römischen Dichters Martial (ca. 38-104 n. Chr.) als stehende Rolle auftaucht. Die zentrale Bedeutung von Berenike bei der Einfuhr von Aromastoffen, die für Parfüms verwendet wurden, macht diese Assoziation glaubhaft, auch wenn sie unbewiesen bleiben muss.

Introduction

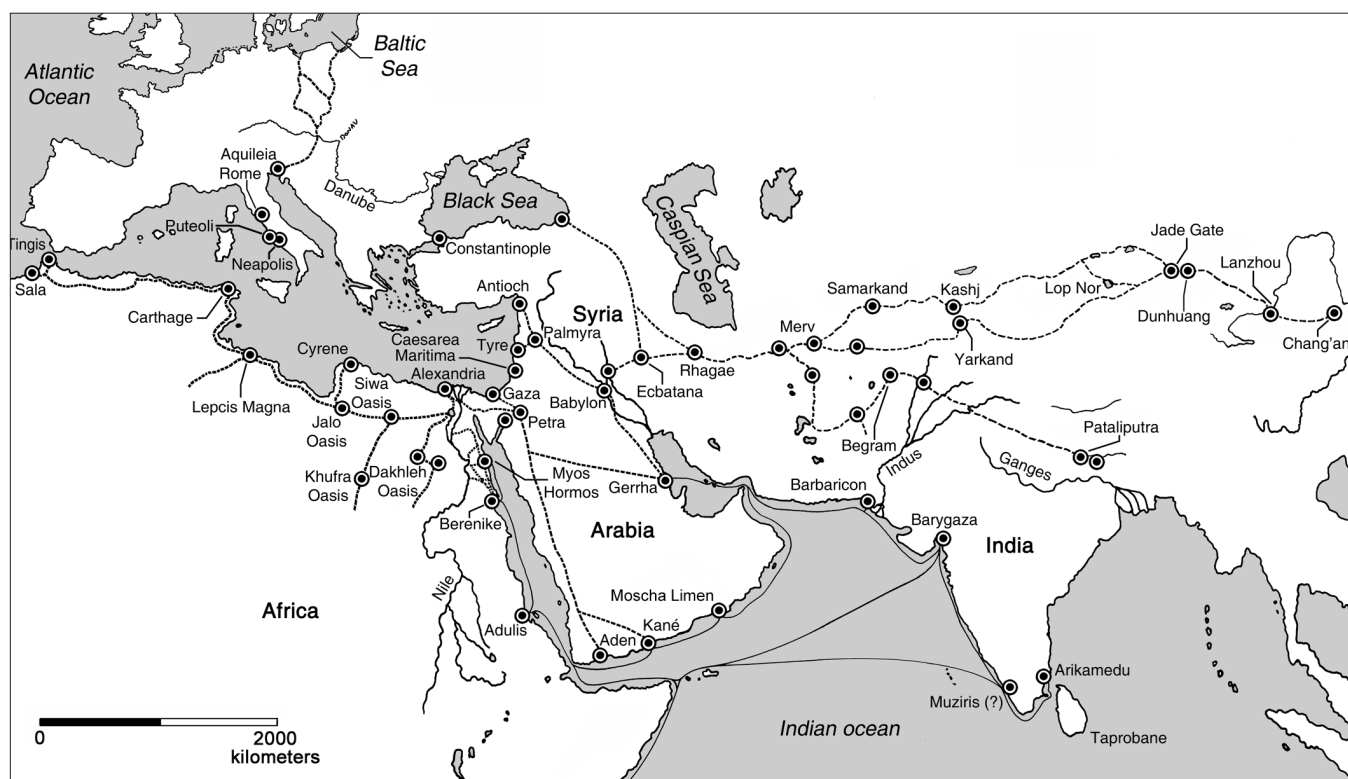
Berenike was one of the two major ports on Egypt's Red Sea coast in the Ptolemaic and Roman periods (roughly 275 BC to the 6th century AD). The other, Myos Hormos (modern Quseir), was located about 300 km north of Berenike. Both served those involved in overseas trade between the Mediterranean and South Arabia, East Africa, and India. The Red Sea was difficult to navigate. Powerful headwinds, unseen reefs, and unexpected shoals often hampered ships on their return from the East. As a result, it was easier to land at the more southerly port of Berenike than at Myos Hormos. Landing at Berenike, however, meant that goods needed to be transported over a longer land route in order to get to the Nile valley, which connected the Red Sea with the Mediterranean, and using large caravans over long distances was costly and risky in its own right. These different logistical challenges caused the two ports to be used for different purposes. Myos Hormos was probably frequented by smaller craft with lighter loads that could better handle the unpredictable waters (DE ROMANIS 2020, 47, 54-55); it was also used as a base for shipbuilding and repair (BÜLOW-JACOBSEN 2013, 567-568). Berenike, on the other hand, was more attractive to large ships that wanted to lessen exposure to the hazards of the Red Sea, such as the pepper carriers coming from India (DE ROMANIS 2020, 31-58, esp. 46-55) (Fig. 1).

Ptolemy II founded Berenike early in the second quarter of the 3rd century BC. The port originally facilitated the importation of elephants,

ivory, and gold from East Africa. It was used until the second half of the 2nd century BC, when elephant hunting declined (DE ROMANIS 2020, 47), and was revived again about a century later, under Augustus, partly because of the Indian pepper trade (SIDEBOTHAM *et al.* 2019, 7-8 with bibliography; DE ROMANIS 2020, 48-49). Over the next two centuries, it became a hub not only for this trade, but also for that in aromatics, precious and semi-precious stones, resins, and other luxury, medicinal, and prosaic goods. We know about Berenike's role in Red Sea maritime trade from archeological evidence and ancient writings. Among the latter is the *Natural History* of Pliny the Elder (AD 23/24-79) and the anonymous mid 1st-century treatise on Red Sea sailing called the *Periplus Maris Erythraei* (for the date, see CASSON 1989, 6-7).¹ Much of the surviving archeological evidence dates to the first two centuries AD. It consists of a range of organic and inorganic objects, such as Indian peppercorn and other botanical products, imported beads and pearls, and textiles (SIDEBOTHAM 2011, esp. 221-258). Greek papyri, ostraca, and inscriptions from the port and its environs further augment these finds. They give valuable information about religion, trade, logistics, prosopography, and other aspects of life at the port during this same period (O.BERENIKE 1-3; AST/BAGNALL 2015).

Through Berenike's archeological and documentary record, we get a fairly vivid picture of the port

▼ Fig. 1. Roman Trading Routes (map by M. Hense).



¹ The geographer and historian Strabo (64/63 BC-ca. AD 24) says more about the importance of Myos Hormos as a Roman trading hub than about Berenike.

during the early Empire, but this picture is much blurrier for later periods, starting already in the late 2nd and early 3rd century. Despite the blurriness, it seems beyond doubt that maritime trade persisted in some form until the 6th century. Recent finds have shown that Berenike was a central trading post for the Blemmyes, a tribe with deep roots in the area, probably well into the 5th century (AST/RAĐKOWSKI 2020). The latest reference to the port is in a hagiographical text called the *Martyrium Sancti Arethae* (27-29) from AD 524/525. After this, however, there is no sign of any activity in Berenike (SIDEBOTHAM 2011, 280-281), that is, not until the year 1818, when the port was “re-discovered” by the Italian explorer Giovanni Battista Belzoni.

By the time Belzoni came upon Berenike, it had been reduced to a mound of sand and rubble. Practically all that was visible on the surface were parts of the central temple perched on a hill in the middle of town. Over the course of the rest of the 19th century, the temple attracted the interest of European and American explorers who documented it with varying degrees of precision (HENSE 2019, 246-251). Then, for decades after this – in fact, for almost the entire 20th century – interest in the site waned, until systematic excavations began in 1994 (SIDEBOTHAM 2011, with further bibliography; for publications after 2011, see SIDEBOTHAM *et al.* 2019, 8 n. 5). When at this time attention returned to the port, it did not immediately focus on the temple again. It was only about five years ago, and thanks to the initiative of Martin Hense, that fieldwork resumed in that part of the site (HENSE

2019, 251-263; SIDEBOTHAM *et al.* 2019, 12-18; in press) (Fig. 2).

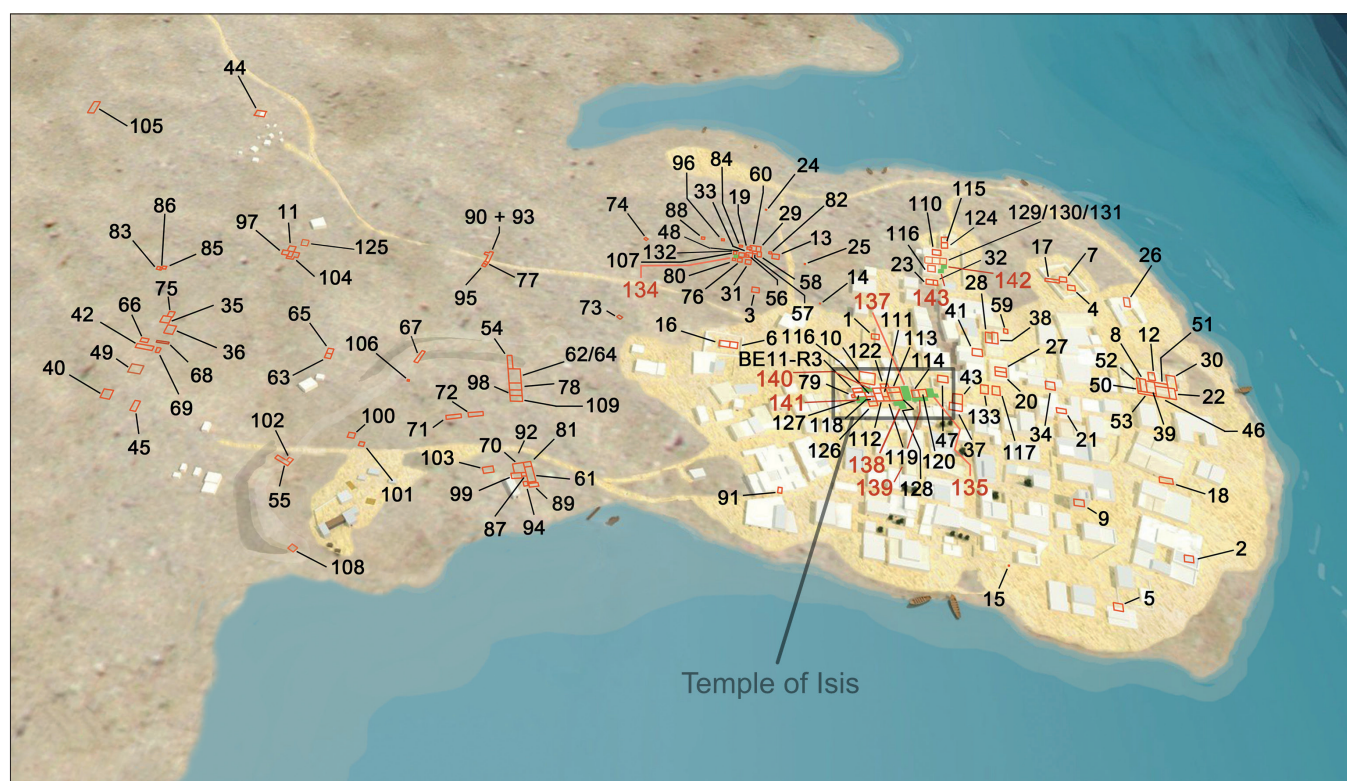
Within the past four seasons of excavations (2015, 2018-2020), the temple, which we now know was dedicated to the goddess Isis (it used to be called the Serapis Temple), has turned up important new evidence for different periods of the port’s history. In particular, it has revealed dozens of Greek inscriptions, albeit many fragmentary, mainly spanning the first two centuries AD. These shed light on some of the people responsible for financing and organising maritime trade. Of special interest are four dedicatory inscriptions related to a possible Puteolan merchant named Marcus Laelius Cosmus, who, as is suggested by one of them, financed the construction of the temple in the reign of Emperor Tiberius and whose agent, as we learn from two others, set up honorary inscriptions in the temple courtyard during the reign of Claudius. This article publishes these inscriptions for the first time.²

I. The merchant Marcus Laelius Cosmus and the Roman Temple of Isis at Berenike

At some point during the reign of Tiberius (AD 14-37), an Italian named Marcus Laelius Cosmus financed the rebuilding of Berenike’s central temple, which he dedicated to the goddess Isis. His temple replaced an earlier Ptolemaic sanctuary dedicated to an undetermined deity, scattered re-

² The results presented here should be considered preliminary, as excavations in the temple are ongoing.

▲ Fig. 2. Plan of Berenike with excavated trenches 1994-2020 (map by M. Hense).



mains of which have been documented over the years (HENSE 2019, 259; AST 2020; SIDEBOTHAM *et al.* in press). We are informed of Cosmus's charitable act by the building inscription (no. 1 below) unearthed in 2020 that adorned the lintel above the main entrance to the temple on the east side of the courtyard.³ This inscription states that Cosmus personally financed the construction of the Isis temple in honour of Tiberius and the emperor's mother Livia (see comm. to 1, line 1). In what year he did this is unclear because of damage to the inscription, but the reference to Tiberius shows it was during his reign, something that had been hinted at by previous archeological finds. For example, already in the 19th century, Tiberius's cartouche had been seen in wall reliefs in the central chamber (MEREDITH 1957, 63-65; SIDEBOTHAM 2011, 83; HENSE 2019, 248-250). In 2019, his cartouche was again identified, this time on a barque stand discovered below the floor in a room of the temple (SIDEBOTHAM *et al.* in press).

Berenike's Isis temple was one of several religious complexes in Egypt built or expanded on under Tiberius. Other constructions from his reign include the hypostyle hall in the Temple of Hathor at Dendera (BAGNALL/RATHBONE 2017, § 8.2; for building inscriptions associated with the temple, see I.PORTES 27-29; BERNAND 1984, 74-75) and the pronaos of the Temple of Ptolemy XII in Athribis, which was dedicated by the *prostates* (the protector) of the goddess Triphis in the year AD 23 (EL-SAYED/EL-MASRY 2012, 18-19 with fig. 1.1.11). At both these places, building activities and decorative embellishments within the sanctuaries were not limited to the time of Tiberius, but spanned decades. The same is true of the temple in Berenike, which preserves evidence of different phases: For example, the temple's propylon was gilded in the reign of Titus (AD 79-81) and the doorjambs bearing the lintel inscription edited below were decorated under the emperor Trajan (AD 98-117).⁴ What is notable about the Tiberian building activity at Berenike is that it coincided with a renaissance in overseas trade between parts of the Mediterranean and the South Arabian, East African, and Indian littoral. Much has been written about the scale and lucrative nature of the Red Sea trade in this period (see recently, *e. g.*, TCHERNIA 2016, esp. 3-9; COBB 2018, 1-27, 78-83), but the discovery of the early Roman building inscription on the gateway lintel makes the picture less abstract

by giving us the name of an important patron of this trade: Marcus Laelius Cosmus.

Marcus Laelius Cosmus was a Red Sea merchant. We know this not from the building inscription on the lintel, but from three inscribed dedication bases, two of them dated to AD 51, that were excavated in 2018 in the Isis temple courtyard (below, no. 2-4). In all of these, Cosmus is called "Merchant of the Red Sea" (ἐμπορος Ἐρυθρᾶς θαλάσσης). His Greek cognomen might mean that he was a freedman, but not necessarily, as a Greek name could be retained by a free-born person who was simply proud of the heritage it embodied (DE ROMANIS 1988, 18-19 with n. 30 = 1997, 171-172 with n. 31; 2006, 248-250 with n. 28). The cognomen Cosmus, which in Greek means "universe" or "world," was surely a fitting tribute for someone born into a family of overseas merchant traders. Nevertheless, we cannot exclude the possibility that he was a freedman. Fortunately, his exact status is not that relevant for this study. It should suffice to say that Cosmus was a wealthy merchant of slave background (how far back, we do not know).

Two of the dedications (2-3) (no. 4 is poorly preserved and was probably never completed) were set up for Cosmus by a freedman named Epaphroditus. They are dated to late July or late August of AD 51 (the time of year when ships departed for the East), in the reign of Emperor Claudius (AD 41-54), during the prefecture of Gnaeus Vergilius Capito and under a previously unattested prefect of Berenike named Publius Julius Rufus. We are certain that Epaphroditus was a freedman (ἀπελεύθερος), because both 2 and 3 say so. As such, he was most likely Cosmus's point man at Berenike, in charge of logistics there and perhaps at other places along the trade route. Through him, Cosmus commissioned the two dedications (2 and 3) "on behalf of those who sail" (ὕπὲρ τῶν πλοῖζομένων). Whether the dedication was intended for the sailors of a single ship, for ship crewmen more generally, or even for members of a *collegium* of merchants (for such associations, see RATHBONE 2007, 314) is unknown.

Dedicating the inscriptions on behalf of those who sail was presumably a preventive measure, in recognition of the potential hazards awaiting the sailors on their long journeys, and of Isis's power to protect. As goddess of the sea (BRICAULT 2020), she was one of the deities whom merchants and sailors appealed to on the eve of a major voyage, which also explains her prominence at the port. She was not, however, the only powerful figure that Cosmus invoked. As noted above, he rebuilt the temple in honour of Tiberius and the emperor's mother. He also honoured the emperor Claudius with a statue, as is clear from dedication no. 2, which refers to the emperor as "Savior". Cosmus was clearly conscious of his debt to the powerful human and divine forces that could affect his trading venture.

3 That this early patron's cognomen was actually Laelius is conjectural; the part of the inscription that bore the name does not survive (see text no. 1). Nevertheless, chances are good that this was his name and that he was the same person as the merchant mentioned in the other inscriptions published below (2-4), even if no. 1 pre-dates the other three by anywhere from 17 to 34 years.

4 I thank Olaf Kaper for information about the Trajanic decorations; the gilding of the propylon is mentioned in a still unpublished building inscription located on two doorjambs within the temple.

Alone, the four inscriptions from the Isis temple give us much information about Cosmus's dealings at the port. If we look outside them at other epigraphic and papyrological sources related to the financing and patronage of Red Sea commerce in the early Empire, we gain further insight into the network of traders who sustained operations in Berenike. Among other things, this evidence should address any lingering uncertainty about the role of Italian merchants in the Red Sea maritime trade (e. g., COBB 2018, 74-77).

Cosmus and the *gens Laelia*

Ampulla potoria

Hac licet in gemma, servat quae nomina Cosmi,
luxuriose, bibas, si foliata sitis. (Martial 14.110)

A Drinking Flask

From this precious vessel, which preserves the name of Cosmus,

you, oh lover of luxury, may drink if you thirst for perfumes.⁵

A wealthy perfumer named Cosmus is a stock character in the epigrams of the Roman poet Martial (ca. AD 38-104). L. Friedländer sees Martial's Cosmus as the most famous perfume and essence merchant of the day at Rome (FRIEDLÄNDER 1886, vol. 1, 218, LXXXVII, 2n.; for further discussion of the figure of Cosmus, see MORENO SOLDEVILA *et al.* 2019, 163-164). Thus, finding the same cognomen attached to a merchant at Berenike seems more than a quaint coincidence, as the place was one of the most important ports for the importation of the aromatics used in perfumes. Berenike itself even contained an aromatics warehouse (ἀποθήκη ἀρωματική), as an inscription discovered recently in the Isis temple courtyard has revealed (AST/BAGNALL 2015, 174-176). Such a warehouse would have safeguarded, at least temporarily, the nard, malabathrum, frankincense, and other aromatics brought from the East, before they were moved to the Nile valley emporium of Coptos for shipment down to Alexandria, and beyond. These goods were the source of significant tax revenue for the Roman state and had to be handled with care in order to prevent theft. Although the warehouse inscription dates to the reign of Trajan (AD 112, July 25), it is possible that a similar facility existed in the time of Cosmus.

I do not want to push the identification of Marcus Laelius Cosmus and the Cosmus of Martial's epigrams too far, but it would not be surprising if the origin of this literary figure was either a single historical personage (quite possibly someone involved in trade with the East) or multiple

generations of perfumers identified by the name, as has been suggested by others (MORENO SOLDEVILA *et al.* 2019, 163). If papyri and inscriptions are an accurate reflection, the name Cosmus was not common outside the area of Berenike in early Roman Egypt. There are only two papyri from between 30 BC and AD 100 that record the name: The first is a tax list dated 30 BC-AD 14 from Egypt's Heracleopolite Nome (BGU 16.2577r.179 and v.64); the second, a loan contract, possibly from the Arsinoite nome, dating to Tiberius's 12th year, AD 25/26 (BGU 11.2116). The interesting thing about the contract is that the lender, a man named Cosmus, personally added a Greek subscription in Latin characters (*Cosmus ... [d]ēdanica tas procim[enas argyriou drachma] s ...*, "I Cosmus loaned the aforementioned silver drachmas...," lines 20-22 with BL VI, 22; IX, 30; XIII, 35), which is very unusual for a Greek papyrus contract. Cosmus was obviously more comfortable with Latin than with Greek. He could easily have come from Italy.

Given how few instances of the name Cosmus survive from early Roman Egypt, it is all the more remarkable that there are three other Cosmi associated with Berenike in documents from the 1st century AD, in addition to the Marcus Laelius Cosmus of the inscriptions edited here (see comm. to 1, line 4). The first is a slave who represented the merchant Marcus Julius Alexander at the port (O.PETR. MUS. 173; AD 43, July 14; for more, see below). The second is an *oeconomus*, or administrator, who set up a dedication in honour of Emperor Domitian (AD 81-96) (AST/BAGNALL in press, 363-364). The third is a man mentioned in a fragmentary Latin papyrus dated by its archeological context to AD 50-75 (O.BERENIKE 2.123.12), although this person could have been identical with any of the others referred to already. Thus, over half of the Cosmi attested in inscriptions and papyri from Egypt in this period were tied to the Red Sea port of Berenike. It is tempting to see here a network of people involved in trade, perhaps from related families. If we assume that Martial's perfumer (or family of perfumers) was connected to maritime trade operations out of the Red Sea and that this poetic association had its roots in a single individual, then Marcus Laelius Cosmus would fit this *Ur*-personage quite well. It does not matter that he pre-dated the poet by a generation or so, as his name could have become synonymous with an aromatics trading company that had long-standing business dealings in Arabian and Indian markets.

But enough about Martial's Cosmus. For our purposes, Marcus Laelius Cosmus's gentilicium (Laelius) is more intriguing than his cognomen, because of its possible association with freedmen from the Italian port of Puteoli. Laelii are attested throughout the Roman empire, but for the period 30 BC to AD 100, Marci Laelii are noticeably concentrated around the port of Puteoli located in the

5 "Der Sinn ist wol [sic]: Wenn du aus dieser Flasche trinkst, kannst du dir einbilden, Nardenwein...zu trinken, da sie früher echte Nardenessenz...enthalten hat und deren Aroma noch bewahrt," (FRIEDLÄNDER 1886, vol. 2, 322, CX, 2n.).

northwest part of the Bay of Naples (ORLANDO 2014, 185-199, esp. 189-191; CAMODECA 2016, 16-17; 2018, 492). A Marcus Laelius Optatus appears in a dedication set up by a group of freedmen in February, AD 30 (CAMODECA 2016, 15-16). A family of Marci Laelii are commemorated by a large sepulchral monument erected in the second half of the 1st century AD along the road to Cumae (ORLANDO 2014, 189-190; CAMODECA 2016, 17, with references to inscriptions). It is true that Marci Laelii appear in similar numbers in Rome, but mainly later; outside Italy, attestations tend to be scattered and also late (ORLANDO 2014, 190-191). While no Marcus Laelius Cosmus has been documented in Puteoli, it seems a fair assumption that the merchant who was responsible for financing Berenike's Isis temple came from this Italian port, especially given the evidence for connections to the port documented elsewhere.

Puteoli, the port of Rome into the 1st century AD, was the central hub joining Italy to Egypt and the East. It served as the landing place for grain shipments from Alexandria, and it was the main harbour from which Campanian wine was exported eastward. It has long been recognised that Puteolan entrepreneurs and their agents were involved in overseas trade via the ports of Myos Hormos and Berenike (RATHBONE 1983, 87-89; DE ROMANIS 1993; ORLANDO 2014, 191-200; TCHERNIA 2016, 42-51). Customs passes found in Berenike show that Italian wine was transported to the port (O.BERENIKE 1.1-92 *passim*, with intro, 18-20; O.BERENIKE 2.149, 155).⁶ Further support for this connection comes from the association of individuals attested in Puteoli with people recorded in the vicinity of the Red Sea. For instance, before Cosmus, we knew of the Puteolan Publius Annius Plocamus, a farmer of taxes on goods acquired in the East whose freedmen and slaves plied the Red Sea trade, with one accidentally landing at the port of Hippuri in modern Sri Lanka after being blown off course while sailing around Arabia (PLINY THE ELDER 6.24.84-85; RASCHKE 1978, 644; DE ROMANIS 1988, 20-29; TCHERNIA 2016, 42-44; COBB 2018, 76-77). This new evidence of a possible Puteolan merchant working out of Berenike makes the connection between Puteoli and the Red Sea even stronger.

Merchants and agents

Marcus Laelius Cosmus and his trading company were active at both major Red Sea ports, Myos Hormos and Berenike. With "trading company" I am referring to the organisation that supported merchants. Evidence for it can be seen in the personalised accounts mentioned in some documents. Merchants had "accounts" (Greek *λόγοι*),

probably within the framework of local granaries and banks (RATHBONE 2007 speculates about the role of banks in the activities of merchants), that were managed by agents at stops along the trade routes. When goods were delivered to an agent, they were often credited to the account or *λόγος* of the patron. The provisions and resources that accrued were intended to support the merchant's operations along the route. The receipt re-edited below (no. 5 = O.PETR. MUS. 127) illustrates how local agents served these companies by managing such accounts. It was issued in AD 41 at the port of Myos Hormos to another Marcus Laelius, a probable freedman named Marcus Laelius Heraclas, for a shipment of wheat that was credited to "the account of Marcus Laelius Cosmus".

Both M. Laelius Cosmus and M. Laelius Heraclas belonged to a network of merchants, their local agents, transporters, craftsmen, secretaries, and others involved in maritime trade operations. We are informed of some of them by two sets of Greek ostraca. The 1st is the so-called Nicanor archive, a group of ninety-five documents spanning 18 BC to AD 69, with the majority dated in the reigns of Tiberius (14-37) and Claudius (41-54) (first published in 1930, they were reedited in 2012 in O.PETR. MUS. 112-206). They comprise receipts for the delivery of goods mostly to the two ports by a Coptos-based transport company run by a Hellenized Egyptian named Nicanor and his family. Many of the recipients of the goods are local agents of the trading companies, such as Heraclas, but there are also soldiers and government representatives. Whether the goods that were transported were intended for consumption at the ports or for export to foreign markets (or a combination of both) is a debated question (FUKS 1951; RUFFING 1993; KRUSE 2018). The second source of information about the Red Sea merchants and their agents are ostraca discovered over the past twenty-five years at Berenike, in particular, the early Roman customs passes published in O.BERENIKE 1 and 2 referred to above. Similar to the Nicanor receipts, they document the transport of assorted commodities, particularly Italian, Syrian, and Egyptian wine, to Berenike for local consumption and/or export abroad (COBB 2018, 220-226; KRUSE 2018, 377-378).

The merchants and agents attested in these sources belonged to two classes.⁷ The first were the (often absentee) merchants and other entrepreneurs who bankrolled the expeditions that moved goods through the various emporia that dotted the trade routes between the Mediterranean and South Arabia, Africa, and India. These merchants

6 I follow RATHBONE (1983, 85-87) in supposing that Italian/Aminaeon wine, which is mentioned in ostraca from Berenike, was produced in Campania and exported from Puteoli.

7 RUFFING (2013) divides the individuals involved in Red Sea trade into "principals" and "agents". He views Italian merchants, or "principals", as more reliant on slaves and freedmen in their trade dealings than Hellenized Egyptians, who rather depended on free individuals. He attributes this difference to larger social and cultural differences between the two groups.

included wealthy Alexandrians such as Marcus Julius Alexander, the son of Alexander the arabarch⁸ and brother of the Egyptian prefect Tiberius Julius Alexander (see FUKS 1951, 214-216, for this identification), as well as Italians such as Publius Annius Plocamus, Marcus Laelius Cosmus, and Marcus Laelius Hymenaeus, quite possibly also from Puteoli, whose trading company is mentioned in a receipt for the delivery of Campanian wine dated Nov. 15, AD 34 (O.PETR. MUS. 165). Whether the merchants depended on the Roman state and/or imperial family in order to operate in the trade zone is still debated (SIDEBOTHAM 1986, 78-112; BOWMAN 2010, 103-107; WILSON 2015, 20-27, 30-31; COBB 2018, 123-126). As far as the evidence from Berenike is concerned, there is no reason to believe that Cosmus was not an independent trader. At the same time, references in the inscriptions to the imperial family (1-2) and to the prefects of Egypt and Berenike (2-3) suggest that he was aware of those he needed to acknowledge if he wanted to maintain a stake in the considerable profits of overseas trade. Thus, imperial control might not have been direct, but the state was not entirely absent. After all, it was the state that provided the infrastructure and security that enabled the merchants to conduct their trade business.

Besides merchants, the other class of agents involved in trade was the slaves and freedmen who served at the ports as local representatives. Epaphroditus, the freedman who set up Cosmus's dedications 2 and 3, is a prime example. Carpus, the slave of Marcus Laelius Hymenaeus (O.PETR. MUS. 165; AD 34, Nov. 15), and Cosmus, the slave of Marcus Julius Alexander (O.PETR. MUS. 173; AD 43, July 14), are further representatives of the type. But they were not the only such agents on site. There were also those who served officials and public institutions: For example, imperial slaves (O.PETR. MUS. 153-154) such as a man named Zethos received deliveries of grain on behalf of the public treasury in Berenike (O.PETR. MUS. 186, AD 54-62; O.BERENIKE 1.106, AD 61, Sept. 20); the freedman and secretary of the aromatics depot, Gaius Julius Eucharistos, oversaw tax assessments on behalf of an official known as the *paralempetes* (AST/BAGNALL 2015, 174-176; AD 112, July 25); Eirenaeus, son of Harpochration, another secretary of a *paralempetes*, must have been of similar status (AST/BAGNALL 2015, 172-174; AD 49, June 24). These agents supported the absentee merchants and officials by, for example, provisioning crews, organising the loading and unloading of ships, storing goods in the warehouses, paying for services, communicating with craftsmen such as the stone-

cutters who carved inscriptions and the sculptors who created dedicatory statues. Similar to their overlords, the local agents also profited (some of them, handsomely) from their activities. This is suggested by the fact that someone like the secretary Gaius Julius Eucharistos could honour his patron, the *paralempetes* Gaius Julius Faustinus, with a monument placed prominently in the courtyard of the temple (AST/BAGNALL 2015, 174-176, 183). This would have been a costly gesture and, thus, not within the means of most people.

Conclusion

Marcus Laelius Cosmus was among a number of enterprising merchants who at an early stage in the development of the Red Sea trade following Rome's annexation of Egypt invested large resources not only in his own operations, but also in the life of the ports. By rebuilding the central temple at Berenike, which was located on one of the most conspicuous places in the harbour, he demonstrated in no ambiguous way his status as an important patron of maritime trade. Agents of other merchants and of officials with jurisdiction over the remote harbour would have inevitably witnessed this display. Over the course of two or three decades, Cosmus advanced his commercial interests at both Berenike and Myos Hormos. What exactly he was trading is unknown, but his probable Puteolan ties suggest that Campanian wine was one of his export commodities. If we indulge Martial, we might conclude that his imports were the aromatics necessary for his perfume operations. Whatever the details, the new epigraphic evidence from Berenike should dispel doubts about the involvement of Italian merchants in the Red Sea trade. Whether Cosmus's company operated independently or with the backing of the imperial government is a question that cannot be settled by these inscriptions. References in them to the Egyptian prefect and to the prefect of Berenike make it obvious that business depended to some extent on official sanction. Furthermore, the fact that at least one of Cosmus's dedications honoured the emperor Claudius might indicate that imperial backing was also operative. Ultimately, however, the goddess Isis was the supreme benefactor of the site. Cosmus's large-scale reconstruction of a temple dedicated to her bears witness to this and to the fact that merchants sought to honour her when entrusting their men to the vicissitudes of sea travel.

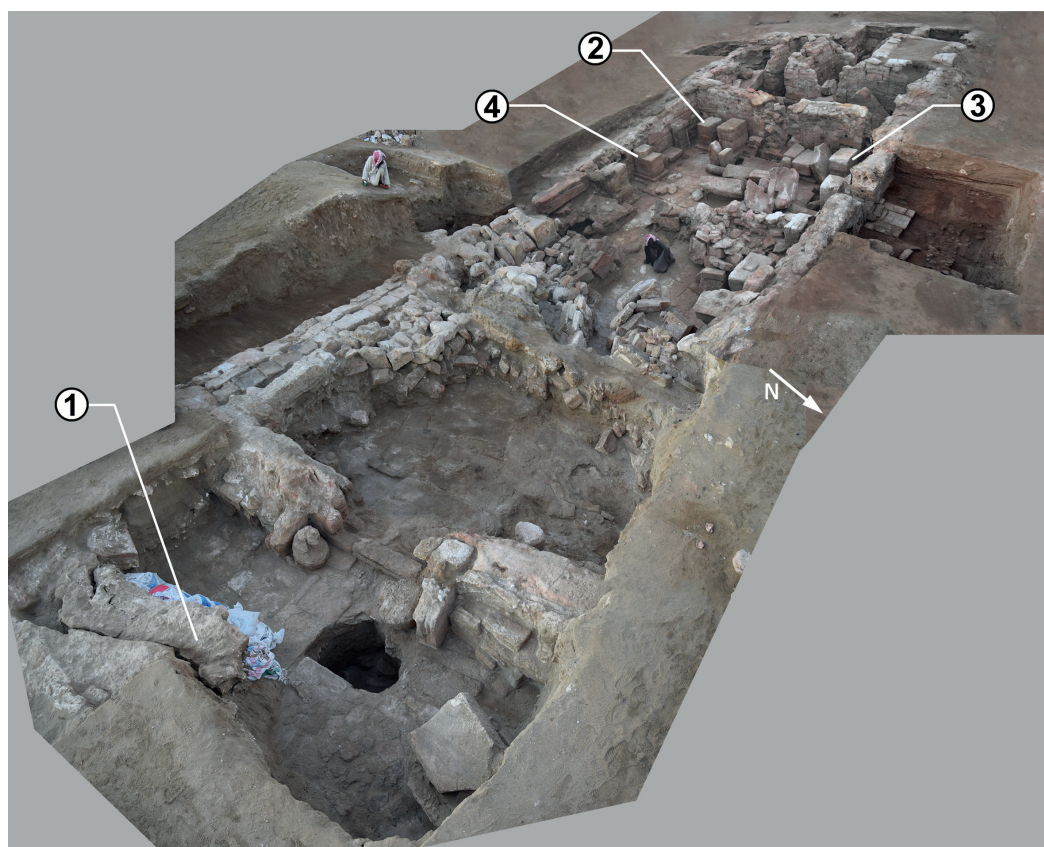
II. New texts related to Marcus Laelius Cosmus

1. Building inscription on Lintel over main entrance to temple

Field and Inventory No.: BE20-135/888/001 (inv. 135001)

⁸ The arabarch was the senior customs official who oversaw taxation on imports, which were assessed at 25 %. Alexander the arabarch was a wealthy and very prominent Jewish Alexandrian (KRAMER 2011, 175-183).

► Fig. 3. Overview of temple with inscriptions labeled; view looking south-west (photomontage by M. Hense).



Dimensions: 238 cm (w) x 78 cm (h) x 50 cm (d)⁹

Date: AD 15-36, August 30 or 31

Fig. 4-5¹⁰

The inscribed lintel block was made from local anhydrite gypsum stone. On the bottom of it, visible from below, was a relief depicting a winged sun disc with flanking cobras; the outstretched wings of the disc were believed to protect the temple.¹¹ The entire block fell down when the east wall collapsed at some point in antiquity. Pieces of it were first documented in January 2019, but the main part, a large slab with torus molding on top, was found in January 2020 lying face down on top of rubble about half a meter from the ground (see Fig. 3). The impact of the collapse caused the lintel

to break on the left, right, and bottom sides. While individual pieces were found in the wall debris scattered around the lintel, several fragments were not recovered. As a result of this loss, the beginning of each of the text's five lines and the ends of lines 4 and 5 are missing. Much, but not all, of the content can be supplied for these lost parts; regrettably, the precise year is missing from the end of line 4.

The inscription is carefully cut, as evidenced by the deep incisions and regular use of interpunction, the latter a convention found in Latin inscriptions and perhaps suggestive of the involvement of someone acquainted with Roman epigraphic practice.¹² The lettering, which is accentuated by red paint, is markedly larger in the first three lines in order to highlight the names of the emperor Tiberius, his mother, and the goddess Isis. The proportionally different letter sizes can be seen when one compares, for example, the alpha in *Ἰουλίαν* in line 2, which measures 7 cm (w) x 10 cm (h), with the alpha in the first instance of *Σεβαστοῦ* in line 5, which is 6 cm x 7 cm.

Across the entire face of the block were nail holes measuring *ca.* 1.4 cm in diameter, some of which still preserved iron nails; from the area around the lintel at least 41 nail heads were recovered. The holes were observed mainly between lines of inscribed text (*e. g.*, below -ΑΣ at the end of line 2 and below -ΤΗΣ and -ΤΗΙ in line 3), but in one

9 The original width was probably 270-290 cm; "(d)" corresponds to the lintels depth, which measures 50 cm without the torus molding and 80 cm with.

10 Both of these figures are imperfect: The orthophoto mosaic does not include a small fragment at the end of the first line, which preserves the top of upsilon (visible in the drawing), nor does it have the piece with the letters -ΣΑ- at the beginning of line 5; the drawing, on the other hand, omits the second iota in *Ἰουλίαν*. Interpunction is also difficult to see in the orthophoto mosaic and is omitted in many places from the drawing; it was confirmed, however, by autopsy.

11 Olaf Kaper, who is studying the Egyptological evidence from the temple, kindly supplied me with the information about the relief; he notes a parallel relief on the outer gate of the Temple of Horus at Edfu, see FAUERBACH (2018, pl. 11a).

12 I owe this observation to Andrea Jördens.

instance a hole was found within the line of writing (before the word ΜΗΝΟΣ in line 5). It is unclear what the nails supported, but it might have been a thin metal sheet, perhaps of gold, which was likely a later addition, as the original inscription had red lettering.

The inscription commemorates the construction of the Isis temple, which we know (see above) was built on the site of an earlier temple. It was set up on the second of the month of Sebastos (either August 30 or 31, depending on the year) in honour of Tiberius and his mother Livia, who is referred to as Julia Augusta, the name given her after her adoption into the Julian family in AD 14 (KIENAST 1996, 84). Marcus [Laelius] Cosmus personally financed the construction. Although the part of the stone with Cosmus's gentilicium is not preserved, we are most likely dealing with the same Cosmus as the merchant mentioned in texts 2-5 below (see comm. *ad loc.*).

[ὕ]περ · Αὐτοκράτορος · Τιβερίου ·
[Κ]αίσαρος · Σεβαστοῦ · καὶ · Ἰουλίας
[Σε]βαστῆς · Ἰσιδι · θεᾶ · μεγίστηι · Μάρκος
[Λαίλιος ·] Κόσμος · οἰκοδόμησεν · ἐκ τοῦ · ἰδίου [·] L [1-2]
5 [Τιβερίου · Καί]σαρος · Σεβαστοῦ · μηνὸς · Σεβαστοῦ · Β · ἐπ' [ἀγαθῶ]

4 l. ὠκοδόμησεν | L stone, l. (ἔτους)

"In honour of Emperor Tiberius Caesar Augustus and Julia Augusta, for Isis the greatest goddess Marcus [Laelius] Cosmus built this with his own means in year [-- of Tiberius] Caesar Augustus, on the 2nd of the month of Sebastos. For [the good!]"

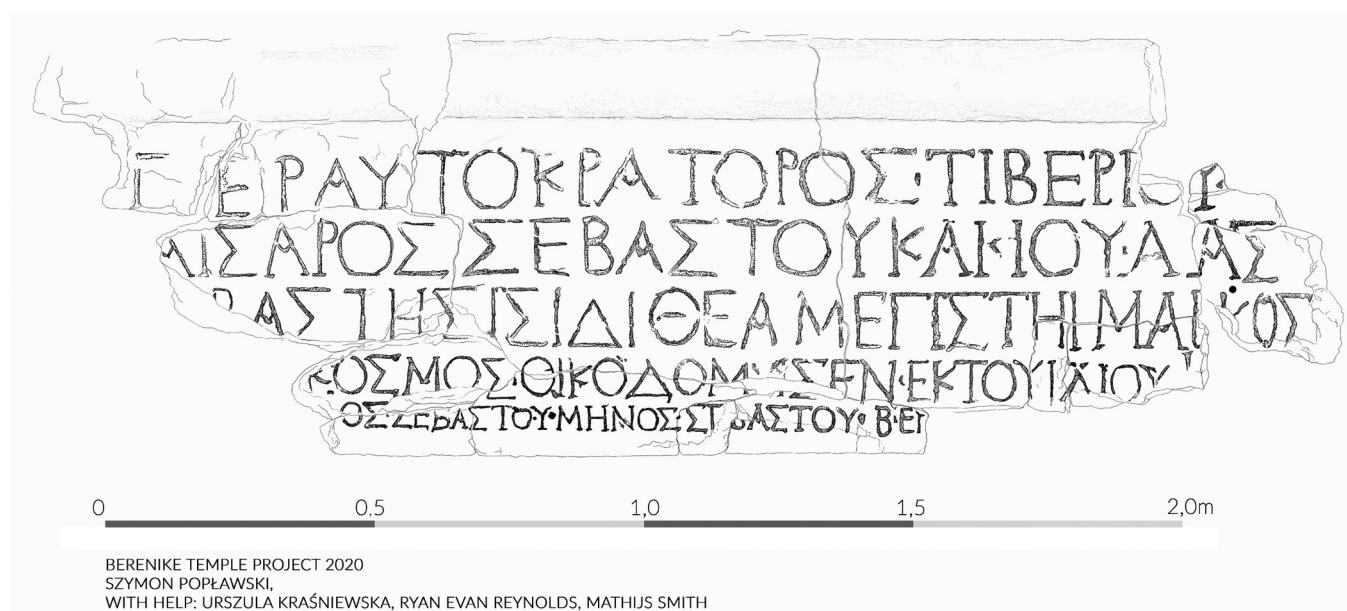
1 The use of ὑπέρ, translated here "in honour of," followed by the name of a king or emperor is a distinctive feature of Greek inscriptional practice in Egypt. In essence, it is thought to show solidarity between the dedicant and the ruler (BINGEN 2007, 274-276).

Interpunctuation at line end here is anomalous. It does not appear at the end of any other line.



Fig. 4. Inscription 1: Orthophoto mosaic of gateway building inscription, Temple of Isis. Scale = 2 m (photo by S. Poplawski).

Fig. 5. Inscription 1: Drawing of gateway building inscription, Temple of Isis (graphic by S. Poplawski).



2-3 Julia Augusta is invoked in three dedications from Egypt, one of which is dated in Tiberius's ninth regnal year and the other two in year 15, see SB 5.8317 (Athribis; AD 23, Feb. 25-March 26 = year 9, Phamenoth ?); SB 22.15621 (Bahariya; AD 28, Aug. 29 = year 15, Sebastos 1); SEG 38.1678 (Akoris; AD 29, April 1 = year 15, Pharmouthi 6). Livia is known to have died at some point in AD 29, perhaps as early as January of that year (BARRETT 2002, 309-310). While it is tempting to take AD 29 as the *terminus ante quem* for this inscription, there is epigraphic evidence from outside Egypt for the honouring of Julia Augusta after her death and before her deification in January AD 42, when she began to be referred to as Diva Augusta (cf. JAGENTUELF 1958, 18-19 with n. 104 [I thank R. Haensch for this reference]; for the date of consecration, see KIENAST 1996, 84).

4 The gentilicium is supplied from 2-5. It cannot be entirely excluded that a different name appeared in the lacuna, and thus that we have some other person than M. Laelius Cosmus. As pointed out above, three other Cosmi are known from Berenike: the slave of the merchant Marcus Julius Alexander (*i. e.*, M. Julius Cosmus) who is acknowledged in a receipt of logs delivered to Berenike on his master's account, O.PETR. MUS. 173 (AD 43, July 14); an *oeconomus*, or administrator, who set up an honorary inscription at Berenike for Emperor Domitian (AD 81-96) (AST/BAGNALL in press, 363-364); a man with this name mentioned in a Latin papyrus dated by its archaeological context to AD 50-75 (O.BERENIKE 2.123.12), although this person could have been identical with any of the others referred to already. Despite the presence of these other Cosmi at the port, it seems safe to assume that the Marcus Laelius Cosmus referred to in 2-5 below was the person responsible for the reconstruction of the temple, because he is the only one of them known to have been a merchant. As such, he would have been in a position to finance works of the scale attested by this inscription.

ἐκ τοῦ: as one would expect, especially on the model of Latin inscriptions from this period, the proclitic (ἐκ) is not separated by an interpunct from the word that follows; for the avoidance of punctuation after proclitics in Latin inscriptions, see WINGO (1972, 32).

5 A small stone fragment found in early February 2020 in the area of the larger inscription might preserve the T of Τιβερίου at the bottom of this line, which would give us Τ[ιβερίου Καί]σαρος. But the reading of the letter on the stone, which is badly worn, is uncertain, and is therefore not reproduced in the text.

2. Honorary inscription for Claudius the Savior on behalf of the Red Sea sailors

Field and Inventory No.: BE-18 119.009 (inv. 119003)

Dimensions: 62 cm (w) x 93 cm (h) x 90 cm (d)

Date: AD 51, July 30 or August 29

Fig. 6

This dedication base consists of two large blocks of local anhydrite gypsum stone positioned on a pedestal; the top block measures 62 cm (w) x 48 cm (h) x 90 cm (d); the bottom, 67 cm (w) x 45 cm (h) x 90 cm (d); the pedestal, 81 cm (w) x 13 cm (h) x 110 cm (d). It was set up in the southwest corner of the courtyard in front of the east wall of the temple (Fig. 3), south of the entrance and of the *Isis-lactans* dedication published in 2015 (see AST/BAGNALL 2015, 172 no. 1). At the bottom of the temple wall is a bench running north-south along the wall; it is slightly higher than the pedestal of the inscribed blocks. In order for the blocks to rest on top of this bench, a notch was made at the bottom of the lower one (a similar design is observed in the *Isis-lactans* dedication base).

The inscription preserves thirteen complete lines of writing. The lettering, which is large in the first two lines and then gets smaller in subsequent lines, is quite shallow and faint, but still shows traces of red paint. Horizontal guidelines are visible; they sometimes appear only below a given line of text, and sometimes both above and below the line. The seam where the two inscribed blocks meet (corresponding to lines 8 and 9) is where the letters are hardest to read.

The text honours the emperor Claudius, who is called "Savior" (σωτήρ), and the base presumably supported a statue of the emperor. The epithet σωτήρ is typical of the eulogising terms found in dedications to Claudius throughout the Greek East. V. M. SCARAMUZZA (1940, 264-266) ascribes the employment of such terms to widespread recognition of the emperor's beneficence. What specific reason Cosmus had for eulogising the emperor is unknown, but one naturally wonders if it was in recognition of imperial backing of his ventures (see above).

The dedication was set up by Cosmus's agent Epaphroditus on behalf of "those who sail" (lines 2-5). Ostraca from Berenike also record the name Epaphroditus, and there is evidence from outside the port for other freedmen and slaves with this name (see comm.). However, none of this evidence aids the identification of Epaphroditus here, who, if he was the freedman of Marcus Laelius Cosmus, would have been known as Marcus Laelius M. lib. Epaphroditus or just Marcus Laelius Epaphroditus.

The inscription is dated to AD 51 during the prefecture of Cn. Vergilius Capito¹³ and under the prefect of Berenike, Publius Julius Rufus. P. Julius

13 Cn. Vergilius Capito was prefect of Egypt from AD 47-52 (JÖRDENS 2009, 528; FAORO 2016, 40-42).

Rufus has not been previously attested in Egypt. Outside the province, in the port city of Salona, the Roman capital of Dalmatia, a man named Publius Julius Rufus built a sanctuary (*aedes*) to Magna Mater (Cybele) at some point in the 1st-3rd c. AD (CIL III, 1953 = TM 184226; ŠAŠEL KOS 1994, 782 no. 3).¹⁴ It is impossible to say whether these two men were the same. For discussion of the office of Prefect of Berenike and for a list of known prefects, see BÜLOW-JACOBSEN/CUVIGNY (2007).

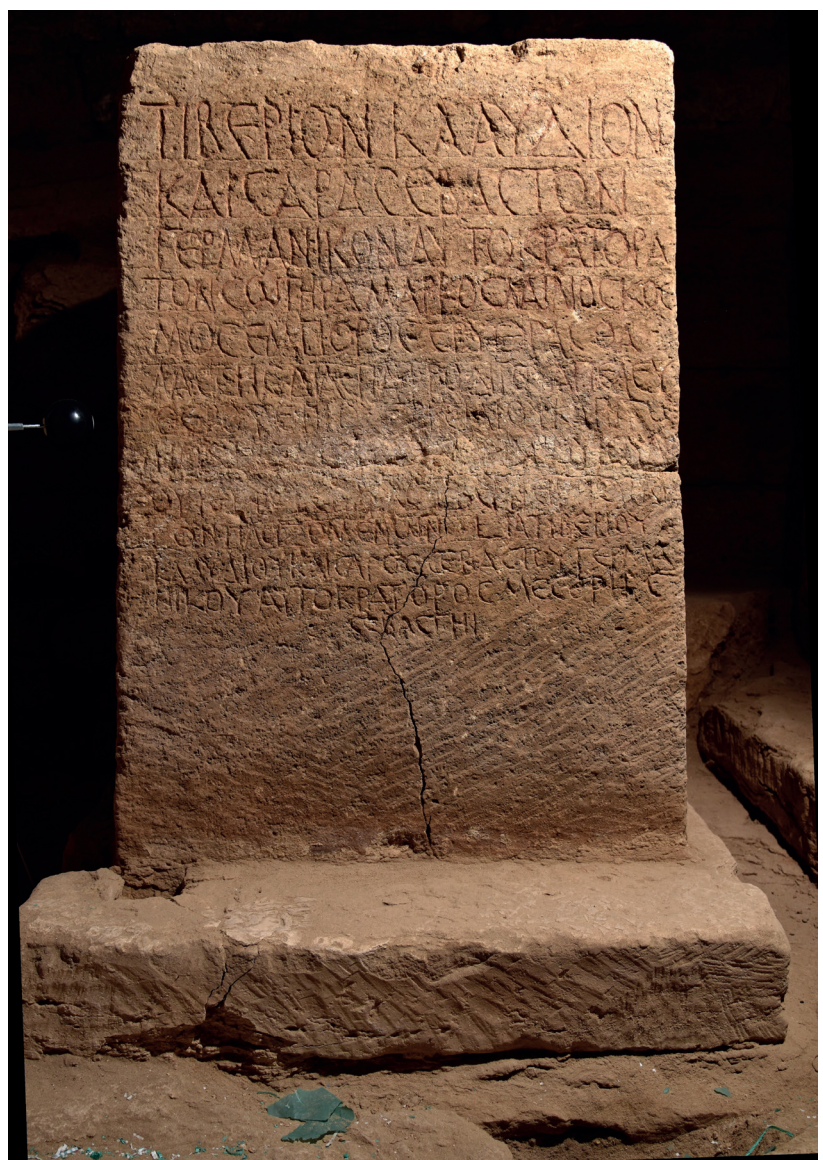
There is some uncertainty about the exact date of this and the following inscription (3). The day is given as Mesore 6, which is said to be an anniversary, or Augustan day (Σεβαστή). Mesore 6 corresponds to July 30, but there is no evidence elsewhere for an anniversary on this day (SNYDER 1938, 212-214; 1964, 159). However, the sixth epagomenal day (Μεσορή, or Καισαρείου, ἐπαγομένων ζ), which occurred every four years and always in the year preceding the intercalary Julian year, is soundly attested as an Augustan day; for examples, cf. SB 8.9824.1 (AD 31, Aug. 29), P.OXY. 2.380.1-2 (AD 79, Aug. 29; re-edited in BENAÏSSA 2011), and P.OXY. 4.722.2-3 (AD 91, Aug. 29). The sixth epagomenal day was most likely celebrated as an Augustan day, because it was Augustus who introduced it in order to align the Egyptian and Julian calendars (SNYDER 1938, 212-214; 1964, 159; SKEAT 1993, pref. and 1-4). Although the Berenike inscriptions do not include the word ἐπαγομένων, it is tempting to assume that this was meant. If this is correct, then we should understand Μεσορή <ἐπαγομένων> ζ Σεβαστή. This idea is further supported by the fact that AD 51, the year in which our inscription was set up, preceded the intercalary Julian year of AD 52.

Τιβέριον Κλαύδιον
Καίσαρα Σεβαστὸν
Γερμανικὸν Αὐτοκράτορα
τὸν σωτήρα. Μάρκος Λαίλιος Κόσ-
5 μος ἔμπορος Ἐρυθρᾶς θα-
λάσσης διὰ Ἐπαφροδίτου ἀπελευ-
θέρου ἐπὶ Οὐεργιλίου Καπίτω-
νος ἡγεμ[όνος καὶ Πο]πλίου Ἰουλί-
ου Ρούφου ἐπαρχοῦ Βερνεϊκῆς ὑπὲρ
10 τῶν πλοιομένων *vac.* (ἔτους) ια Τιβερίου
Κλαυδίου Καίσαρος Σεβαστοῦ Γερμα-
νικοῦ Αὐτοκράτορος Μεσορή ζ
Σεβαστή

7 Ι. Οὐεργιλίου 9 Ι. Βερνεϊκῆς 10 Ι. τῶν

“(A statue of) Tiberius Claudius Caesar Augustus Germanicus Imperator, the Savior, Marcus Laelius Cosmus, merchant of the Red Sea, (set up) through the freedman Epaphroditus, under

¹⁴ Salona was an important center for the cult of Cybele (ŠAŠEL KOS 1994); coincidentally, a papyrus dating to the 1st c. AD and containing verses related to the goddess Cybele was discovered at Berenike in 2012 (AST/LOUGOVAYA 2015).



Vergilius Capito, Prefect, and Publius Julius Rufus, Prefect of Berenike, on behalf of those who sail. Year 11 of Tiberius Claudius Caesar Augustus Germanicus Imperator, Mesore 6, Augustan day”.

6-7 This freedman is found only here and in 3. The name Epaphroditus is quite common (for the many attestations at Rome alone, see SOLIN 2003, 343-348): An imperial freedman and merchant called Gaius Julius Epaphroditus is referred to in customs passes from Berenike that document the transport of wine to the port in the mid-1st century AD (O.BERENIKE 1, 27 and 1.80-85; 2.147, 148); in addition to him, an Epaphroditus slave of Delias(?), slave of Acimnestos(?), slave of Caesar,¹⁵ turns up in five osth-

▲ Fig. 6. Inscription 2: Honorary inscription for the emperor Claudius (photo by E. Fuchs).

¹⁵ In Greek this is Ἐπαφρόδειτος Δηλίου Αἰμνήστου Καίσαρος (O.BERENIKE 2.184-188). The editors take ἀείμνηστος as a proper name (O.BERENIKE 2, 74-75) as opposed to the adjective describing a deceased person, “of eternal memory”. If, however, it is the latter, then it could describe either Caesar or Delias; ἀείμνηστος is associated with the deceased in funerary epitaphs (e. g., I.FAYOUM 1.57 = TM 8646, Hawara, 1st c. AD).

raca of the same period, which also document the transport of wine (O.BERENIKE 2.184-188). Outside Berenike, we find a freedman named Tiberius Claudius Epaphroditus acting as an agent for the merchant Tiberius Claudius A- in receipts for deliveries to Myos Hormos in the years AD 57-62 (O.Petr. Mus. 145, 147, 204 – whether the latter text pertains to Berenike or Myos Hormos is unclear. See, too, O.PETR. MUS. 155; SIDEBOTHAM 1986, 89-90 hints at the possibility that Nero's freedman Tiberius Claudius Epaphroditus may be at stake in these ostraca).

3. Honorary(?) inscription of Marcus Laelius Cosmus on behalf of the Red Sea sailors

▼ Fig. 7. *Inscription 3: Dedication of Marcus Laelius Cosmus for the sailors. Scale = 50 cm (photo by S. E. Sidebotham).*

Field and Inventory No.: BE-15/18 111.026 (inv. 111006)

Dimensions: 66 cm (w) x 100 cm (h) x 87 cm (d)

Date: AD 51, July 30 or August 29

Fig. 7



The dedication base consists of two large blocks of local anhydrite gypsum stone. It was set up north of the entrance to the temple (Fig. 3), in the north-west corner of the courtyard, in a position symmetrical with 2; the top block measures 66 cm (w) x 50 cm (h) x 87 cm (d); the bottom, 66 cm (w) x 50 cm (h) x 85 cm (d); the pedestal, 82 cm (w) x 19 cm (h) x 100 cm (d).

The inscription preserves fourteen lines of writing. The stonecutter responsible for it was not the same as in 2, as is clear from the lettering. Given the fact the two dedications bear the same date, we can conclude that more than one stonecutter was working on site at the time. The inscription is nicely carved in large, mostly bilinear letters (except for Φ) that show traces of red paint. The text is complete on the left, right, and bottom. The top, however, is heavily damaged, the gypsum basically having melted under adverse environmental conditions that destroyed the first lines of writing. The distance from the top of the stone to the top of the first preserved line of text is *ca.* 13 cm. Since letter heights range from 3.8-4.5 cm, we can presume that two to three lines are missing. If the text of 2 is any guide, we might expect that these lines honoured someone such as the emperor Claudius or the goddess Isis, or yet another person or deity, and that the blocks supported a statue.¹⁶ The end of line 1 is damaged by salt accretions, and the top block has shifted forward obscuring letters around the seam (lines 7-8).

The preserved text of 3 repeats verbatim no. 2, line 4 (from Μάρκος) until the end. For the date, see the introduction to 2 above.

Μάρκος Λαίλι[ος Κόσμος]
ἐμπορος Ἐρυθρᾶς
θαλάσσης διὰ Ἐπα-
φροδίτου ἀπελευθέ-
5 ρου ἐπὶ Οὐεργιλίου
Καπίτωνος ἡγεμό[ν-]
ος καὶ Ποπλίου Ιουλ[ί-]
ου Ρούφου ἐπάρχου
Βερενίκης ὑπὲρ τῶν
10 πλοιοζόμενων *vac.*
(ἔτους) [ι]α Τιβερίου Κλαυδίου
Καίσαρος Σεβαστοῦ
Γερμανικοῦ Αὐτοκράτορο[ς]
Μεσορῆ ς Σεβαστῇ *vac.*

5 1. Οὐεργιλίου

¹⁶ If it is a duplicate of inscription no. 2, it would not be a unique instance of two copies of the same inscription being set up in the temple courtyard: There survive two unpublished inscriptional copies of a dedication set up in the year AD 209. Cf., too, O.BERENIKE 2.118 and 119, duplicate dedications, one perhaps copied directly from the other, from the reign of Nero (54-68) addressed to Zeus by a woman named Philotera; while found just east of the courtyard, they may have originated in the temple and were recycled later (I thank Steve Sidebotham for information about these inscriptions).



▲ Fig. 8. Inscription 4: Upper part of a dedication of the merchant Marcus Laelius Cosmus. Scale = 20 cm (photo by S. E. Sidebotham).

“(A statue of)... Marcus Laelius [Cosmus], merchant of the Red Sea, (set up) through the freedman Epaphroditus, under Vergilius Capito, Prefect, and Publius Julius Rufus, Prefect of Berenike, on behalf of those who sail. Year 11 of Tiberius Claudius Caesar Augustus Germanicus Imperator, Mesore 6, Augustan day”.

6-7 The word break at the end of the line does not properly follow the syllabic division; it should have occurred before *v* in *-vos*.

13 There does not seem to have been room for sigma at the end of the line, unless it was squeezed into the interlinear space above.

14 If *iota* adscript was carved at the end of the word Σεβαστή, as it is in 2.13, it is no longer visible.

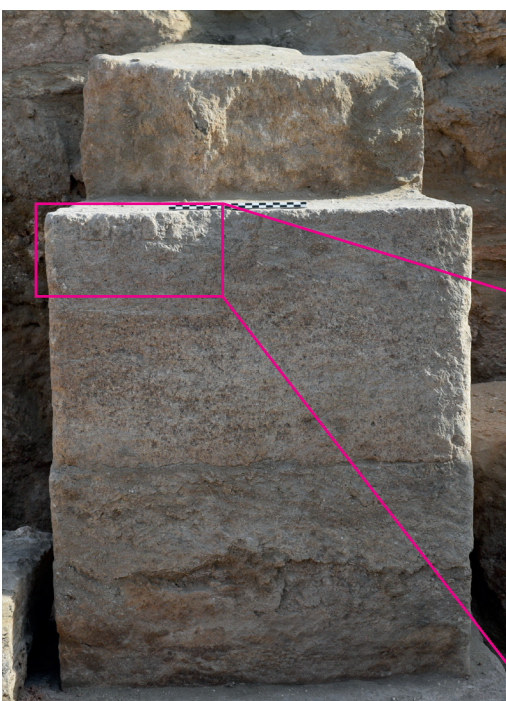
4. Remains of a dedication of Marcus Laelius Cosmus

Field and Inventory No.: BE-18 119.011.020 + BE-19 121.022 (inv. 119001)

Dimensions, fragmentary upper block: 62 cm (w) x 20 cm (h) x 50 cm (d); lower two blocks, *in situ*: 61 cm (w) x 74 cm (h) x 90 cm (d); pedestal: 82 cm (w) x 15 cm (h) x 103 cm (d).

Date: *ca.* AD 51?

Fig. 8-9



Μάρκος Λαίλιος
Κόσμος ἔμπο-
ρος Ἐρυθρᾶς θαλάσ-
σης *vac.*

...Marcus Laelius Cosmus, merchant of the Red Sea *vac.*

▼ Fig. 9. Inscription 4: Lower part of 4 *in situ*, with last three letters of θαλάσσης visible in top left corner. Scale = 20 cm.



Three fragments of the lower part of a block, which was broken on top, were found in 2018 in three different parts of trench 119 in the temple courtyard (Fig. 8). The following year, two more blocks of the same dedication measuring 61 cm (w) x 36 cm (h) x 90 cm (d) and 61 cm (w) x 38 cm (h) x 90 cm (d), respectively, were discovered standing on a pedestal *in situ* along the south wall of the temple courtyard (Fig. 3). Surprisingly, the inscription was apparently never finished, as there are no signs of inscribed letters after ΣΗΣ in line 4, which is visible in the upper left corner of the top block of the still-standing base (Fig. 9). It could be that the rest of the text was painted rather than carved.

As with 2 and 3, this inscription preserves the name of Marcus Laelius Cosmus and his title, “Merchant of the Red Sea”. There appears to have been text above Cosmus’s name, which is now lost. This indicates that, as with 2 and probably with 3, the inscription honoured some individual.

5. Receipt for wheat delivery to Myos Hormos

Publication No.: O.PETR. MUS. 127 = O.PETR. 260 (TM 45001)

Date: AD 41, May 25

Illustration: photo available on the CD included with O.PETR. MUS.; link to online image at <http://www.papyri.info/ddbdp/o.petr.mus;;127> (accessed 20.01.2021).

This ostrakon also attests Marcus Laelius Cosmus, but his name was not correctly deciphered by previous editors J. G. Tait (O. PETR. 260) and G. Messeri (O.PETR. MUS. 127), the latter having read Κόρδος in the genitive. That Κόσμου and not Κόρδου is the right reading is clear from the image on the CD that accompanies O.PETR. MUS. There, one can easily see the round bowl of a lunate sigma; rho, by contrast, is impossible to make out. A revised text is presented below.

Three individuals bearing the gentilicium Laelius are attested in ostraca from the Nicanor archive (see above). In addition to Cosmus, there is the merchant Marcus Laelius Hymenaeus (O.PETR. MUS. 165; Berenike, AD 34, Nov. 15), on whose account a slave named Carpus receives wine. In the ostrakon re-edited here, the agent Marcus Laelius Heraclas, together with a slave probably named Mocimus (see comm. to line 1f.), acknowledges the receipt in Myos Hormos of a delivery of wheat intended for the “account” (λόγος) of Marcus Laelius Cosmus.

Μάρκ[ο]ς Λάλις Ἡρακλᾶς καὶ Μόκι-
μος Μιλήσι Νικάνορος χαίριν. πα-
ρέλαβ[ο]ν παρὰ σοῦ ἐπὶ Μυδὸς Ὀρ-
μου εἰς τὸν Μάρκου Λαλίου Κόσμου
5 λόγον πυροῦ ἀρτάβας δέκα. (ἔτους) α
Τιβερίου Κελαυδίου Καίσαρος Αὐ-
τοκράτορος Γερμανικοῦ
Φαχών

1 Ἰ. Λαίλιος | Μαρ. . . . Ἡρακλῆς (Tait) 1-2
Νόκιμος (Tait) : Νόκιμος, Ἰ. Δόκιμος (Rathbone, v.
O.PETR. MUS. 127.1-2n.) : Νόκιμος, Ἰ. Μόκιμος
(Cuvigny, per litt.) 2 Ἰ. Μιρήσει : Μιρήσι (Tait) |
Ἰ. χαίρειν 4 Ἰ. Λαλίου : Λαλίου Κόρδου (Mes-
seri) : Μαιουκο. . . (Tait) 6 Ἰ. Κλαυδίου 6-7 Ἰ.
Αὐτοκράτορος 8 Ἰ. Παχών

“Marcus Laelius Heraclas and Mocimus to Mire-
sis son of Nicanor, greetings. We received from you
at Myos Hormos for the account of Marcus Laelius
Cosmus ten artabas of wheat. Year 1 of Tiberius
Claudius Caesar Imperator Germanicus, Pachon
30”.

1-2 H. Cuvigny makes the good suggestion (*per
litt.*) that Νόκιμος, the reading of O.PETR.
MUS. 127 and O.PETR. 260, a name not at-
tested elsewhere, was probably intended for
Μόκιμος, a known Semitic name (WUTHNOW
1930, 78 for Mqym-w; GRAF 1994, 301); here
it likely designates a Nabataean slave – perhaps,
I would add, one of Cosmus’s own slaves. Judg-
ing from the image in O.PETR. MUS., I would
go one step further in arguing that Μόκιμος is
the correct reading of the name. The ink of the
ascending right diagonal merges with the right
vertical leg, which would account for the blob
of ink in the middle part of the letter. The μ in
Μάρκος at the beginning of line 1, and, even
more, the μ in -μος at the beginning of line 2 are
similarly malformed. While the orthography in
this ostrakon is quite poor (there are even mis-
spellings in the emperor’s name and title), I give
the writer the benefit of the doubt by printing
Μόκιμος. A Palmyrene archer named Marcus
Aurelius Mocimus appears in a much later in-
scription from Berenike dated AD 215, Sept. 8
(SB 28.16916; TM 142358). The name is oth-
erwise unattested in either of the Red Sea ports.

2-3 A plural subject governs a singular verb also
in O.PETR. MUS. 145.3 (I thank Cuvigny for
pointing this out).

3-4 Here, again, the word at the end of the line is
not divided in accordance with the syllables;
the break should be before the μ in -μου.

6-8 The regnal formula is unique. Messeri suggests
that Germanicus might be intended as the hon-
orific month name Germanikeios, which corre-
sponded to Egyptian Pachon (O.PETR. MUS.
127.7n.). More likely, the writer just mixed up
a formula that he was not very accustomed to
writing.

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Abbreviations

BGU

Aegyptische Urkunden aus den Königlichen (later Staatlichen) Museen zu Berlin. Griechische Urkunden (Berlin 1895-2014; currently 20 vols.).

BL

Berichtigungsliste der griechischen Papyrusurkunden aus Ägypten (1922-2007; currently 13 vols.).

CIL

Corpus Inscriptionum Latinarum (1863-).

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Weighing equipment in Late Bronze Age graves in the Seine and Yonne valleys

by CLAUDE MORDANT, REBECCA PEAKE & MAFALDA ROSCIO

Scales, weights, early Late Bronze Age, Paris basin, hub

Burials dating to the beginning of the Late Bronze Age (ca. 14th-13th century BC) in the northeast of France include an array of personal objects that give greater insight into social status and function as well as origin and mobility. Setting aside the usual adornments present in most graves, burials include more specialised objects such as weighing equipment: small bone or antler weighing beams and weights purposely made or of a more opportunistic nature. A cluster of tombs of bearers of weighing equipment has been noted around the Upper Seine and Yonne valleys, located about 100 km to the southeast of Paris (France). In this area, almost every cemetery dating to the beginning of the Late Bronze Age includes one burial containing weighing equipment. One of the most important burials sites at Migennes has three such burials, one of which (tomb no. 298) houses two kits as well as specialised metalworking tools. This unique find underlines the specialised knowledge of the individual buried in this rich grave by raising the question of the individual's (be he artisan or trader) origin and mobility.

However more importantly, the cluster of these very particular burials illustrates the vitality of the Seine-Yonne area at the beginning of the Late Bronze Age, a probable economic hub located between two major river systems that allowed easy contact and trade with both the Atlantic and North Alpine regions as well as further afield towards the Mediterranean. The bearers of weighing equipment played an important role in the emerging economy of this area as metalworking artisans and traders but also as the guarantors of a widely used system of weights and measures and as intermediaries working for an elite group that controlled the flux of trade from one area to another.

Waagen und Gewichte in spätbronzezeitlichen Gräbern aus den Tälern der Seine und Yonne

Waagen, Gewichte, frühe Spätbronzezeit, Pariser Becken, Knotenpunkt

Einige Bestattungen im Nordosten Frankreichs, die an den Beginn der Spätbronzezeit (ca. 14.-13. Jh. v. Chr.) datiert werden, umfassen eine Reihe von persönlichen Gegenständen, die einen Einblick in den sozialen Status, die Tätigkeiten sowie in die Herkunft und Mobilität der Individuen geben. Abgesehen von den üblichen Schmuckausstattungen, wie sie in den meisten Gräbern zu finden sind, beinhalten die Bestattungen spezialisierte Gegenstände wie Geräte zum Wiegen: kleine Waagebalken aus Knochen oder Geweih und Gewichte, die extra angefertigt wurden oder auf Naturformen zurückgehen. In den Tälern der oberen Seine und der Yonne, etwa 100 km südöstlich von Paris (Frankreich), wurde eine Ansammlung von Gräbern von Personen mit Waagen und Gewichten festgestellt. In diesem Gebiet gibt es auf fast jedem Gräberfeld, das an den Beginn der Spätbronzezeit datiert wird, eine Bestattung mit derartigen Funden. Eine der bedeutendsten Begräbnisstätten in Migennes verfügt über drei solcher Bestattungen, von denen eines (Grab Nr. 298) zwei Sets mit Waagen und Gewichten sowie spezielle Metallbearbeitungswerkzeuge enthält. Dieser einzigartige Fund unterstreicht das spezialisierte Wissen der in diesem reichen Grab bestatteten Person, indem er die Frage nach der Herkunft und Mobilität des Individuums (sei es ein Handwerker oder ein Händler) aufwirft. Noch wichtiger ist jedoch, dass die Häufung dieser sehr speziellen Bestattungen die Vitalität des Seine-Yonne-Gebiets zu Beginn der Spätbronzezeit veranschaulicht. Die Region stellte wahrscheinlich ein Wirtschaftszentrum zwischen zwei großen Flusssystemen dar, die einen einfachen Kontakt und Handel sowohl mit dem atlantischen und nord-alpinen Raum als auch weiter in Richtung Mittelmeer ermöglichten. Die Nutzer von Waagen spielten in der aufstrebenden Wirtschaft dieses Gebietes eine wesentliche Rolle als metallverarbeitende Handwerker und Händler, aber auch als Garanten eines weitverbreiteten Gewichts- und Maßsystems. Sie waren Mittelsleute einer Elite, die den Handelsfluss zwischen den Regionen kontrollierte.

Introduction

The early Late Bronze Age in the south-east of the Paris basin is documented by many large cemeteries, where the burials, inhumations and cremations, are richly adorned with an extensive array of bronze ornaments, weapons and more specific objects such as weighing sets or even metalworking tools. Apart from the initial treatment of the body, inhumations and cremations dating to this period are almost indistinguishable, they have identical grave goods, similar architectures and can be indeterminately located at the centre of a funerary monument. The burials also include pottery vessels that were probably filled with perishable offerings of food and drink and in the case of the cremations, contained the cremated remains of the dead. The pottery of the Seine-Yonne area has a typical cannellated decoration belonging to the northern “rilled ware” group (MORDANT 2013; PEAKE *et al.* 2017a; ROSCIO 2018). In chronotypological terms, the distribution of rilled ware illustrates the western extension of the North Alpine Cultural Complex that is linked to the Middle Bronze Age Eastern Tumulus Culture (Culture des tumulus orientaux). It is echoed by its coun-

terpart the southern rilled ware cultural group, with influences from the south of France and Italy. During the early phase of the Late Bronze Age the area of the Seine-Yonne confluence shows great economic vitality due to its close contacts with the south of France, the Atlantic coast and North Alpine cultural complex via its extensive hydrographic network made up of the Seine valley and its many tributaries, the Yonne, the Armançon, the Serein and the Aube (MARCIGNY *et al.* 2017) (Fig. 1). From sources in south Burgundy and the Champagne area, these river systems flow towards the west and the south-western point of the Ile-de-France cuesta, where the Seine and Yonne rivers converge. The Seine then joins with the Marne and the Oise rivers in the Paris area before reaching the English Channel at Le Havre. This natural communication route was widely used for trade, providing an extensive network linking areas across France. The Upper Seine valley, the stretch of the Seine before its confluence with the Yonne, played a major role within this trade and communications network by linking the Atlantic coast to the North-East of France and beyond, via the Upper Rhine, to south via the Saone, which opens onto the Jura, the Alps and the Rhône valley.

▼ Fig. 1. The location of the rilled ware cultural complex within the environment of contemporary cultural groups of the early phases of the Late Bronze Age (14th-13th century BC) (© M. Roscio).



1. The bearers of weighing equipment

1.1. Women and men identified by their personal effects

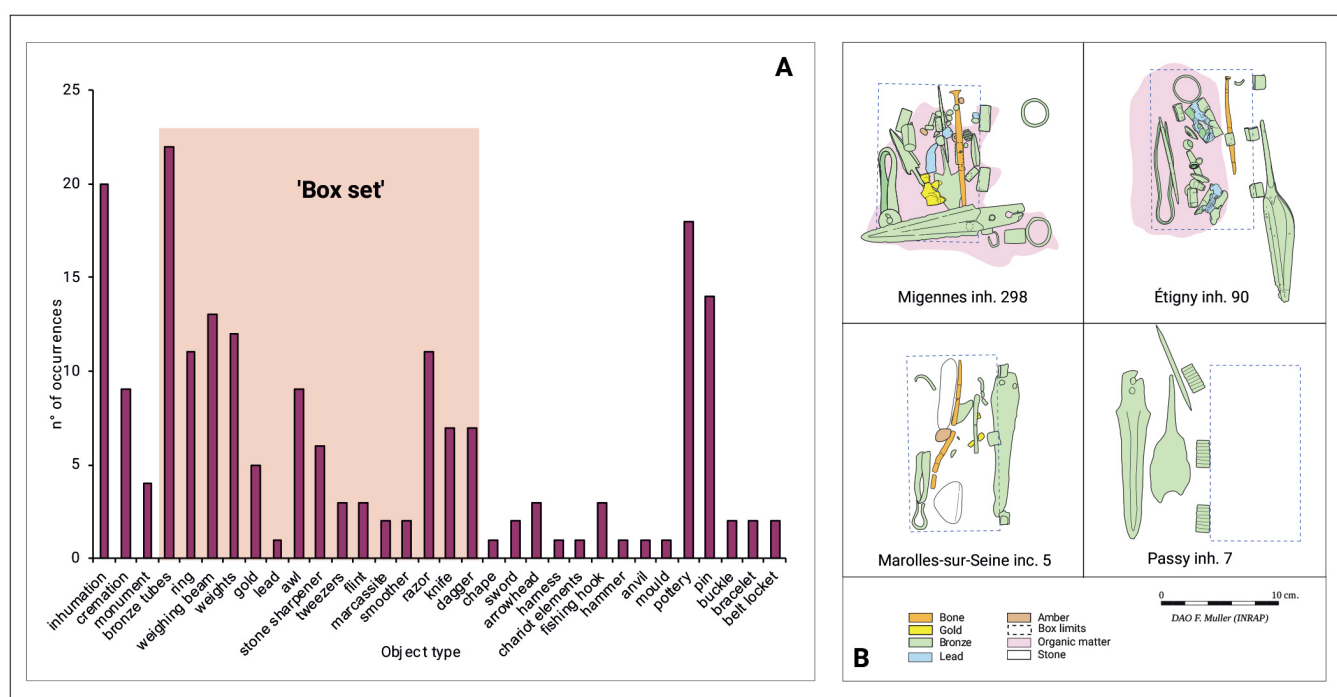
The rich grave goods found in both female and male burials of the Late Bronze Age in the Seine-Yonne area reflect the social position and status of the individuals. The objects are often personal effects, such as jewellery and other adornments worn by the deceased at the moment of burial (ROTTIER *et al.* 2013; DELATTRE *et al.* 2015; ROSCIO 2018). The practice of adorning the body with personal items is a direct influence of the Eastern Tumulus Culture of southern Germany, which spread across north-eastern France during the second half of the Middle Bronze Age and the beginning of the Late Bronze Age (WELS-WEYRAUCH 1989). It contrasts strongly with areas further to the west where cremation is widely practiced and where burials contain little or no preserved grave goods (PEAKE *et al.* 2017b). Grave goods from the richer more privileged burials do provide information on gender, however this is not so much the case for the lower status burials, which contain a more standardised and “gender neutral” set of ornaments (ROTTIER *et al.* 2013; ROSCIO 2019; *in press*). Some female burials, perhaps the most eminent, are adorned with a rare and rather distinctive object worn at the belt, which consists of a tusk from a male wild boar enclosed within a wire net. The distribution map illustrating the burials that contain these particular items shows clusters at the various river confluences: Seine-Yonne, Seine-Aube, Yonne-Armançon, which underline the pre-eminence of these territories and of the elite that governed them (MORDANT/GOUGE 1993) (*cf. infra*). The most recognisable male attributes

found in graves are swords of Rixheim type (burials at Courtavant, Evry, Migennes,) or of Pépinville type (La Colombine burial), but these larger weapons are rare in funerary contexts. In contrast, small bronze daggers and knives are more common, they are sometimes found with a pouch or a box that contains a set of personal items including tweezers, a razor and various small tools such as chisels and awls. Weighing sets can also be added to this long list of personal equipment as well as the specialised metalworking tools (Fig. 2).

1.2. Weighing equipment: The example of the inhumation 90 from Etigny “Le Brassot” (Yonne) and the cremation burial 5 from Marolles-sur-Seine – “Les Gours-aux-Lions” (Seine-et-Marne)

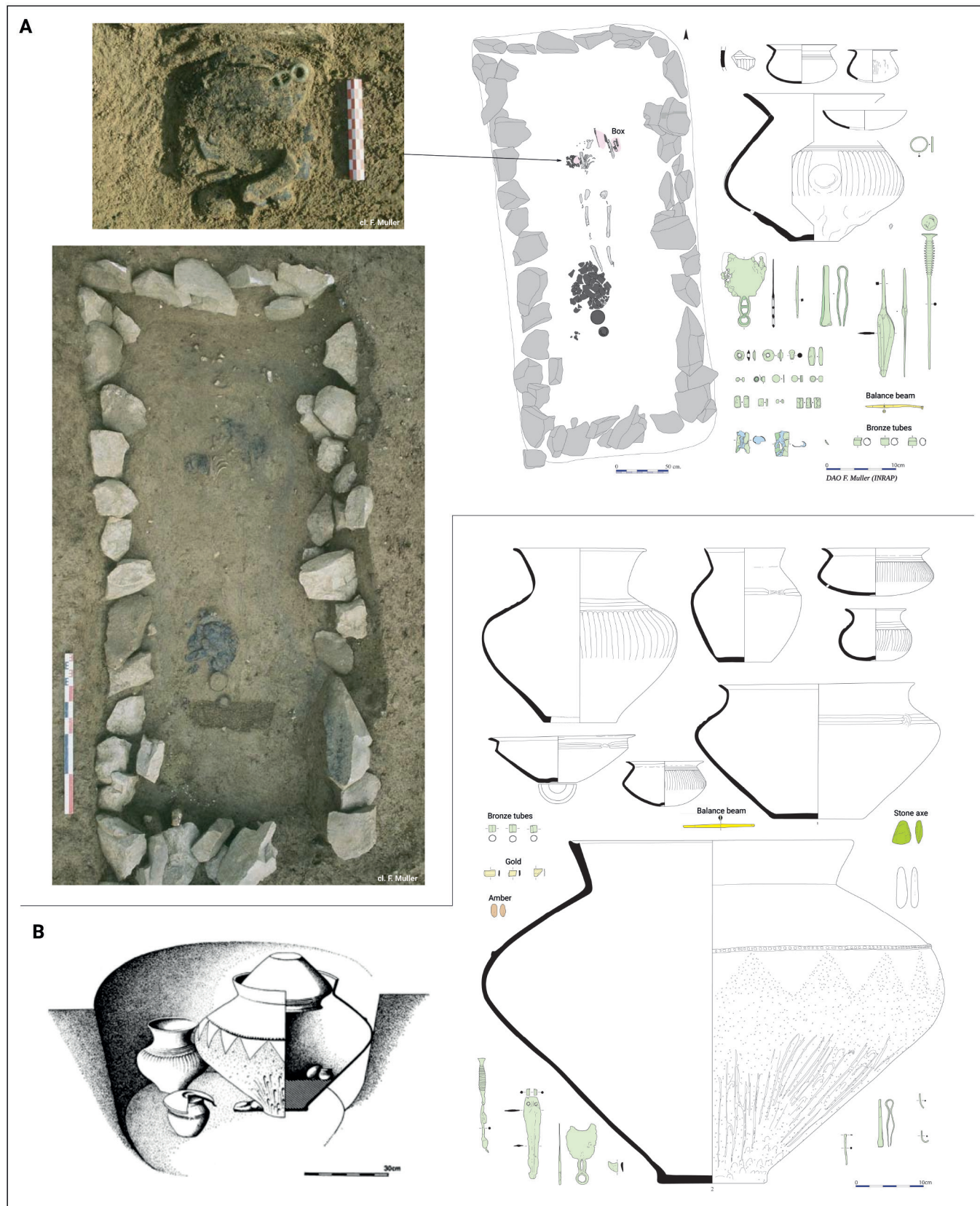
Two burials from the Seine-Yonne valleys have provided good examples of typical Late Bronze Age weighing equipment found in the area. The first, from the Etigny cemetery and found close to a circular ditch monument with a central tomb, is the inhumation of an adult male lying at the centre of a large rectangular pit (4.10 m x 1.80 m; 0.50 m in depth) dug to accommodate a wooden lining itself held in place by large sandstone blocks (ROSCIO 2018, pl. 74). Various objects make up the grave goods. The tomb contains the usual collection of pottery vessels: a large pot, goblets and a small bowl, which were placed at one end of the chamber. A small wooden box marked by three bronze tubes that made up the fastening was placed at the other end of the chamber to the right of the head (Fig. 3A). The box contained tweezers, a balance beam and several small weights of different shapes and sizes including the detached collars of two bronze pins. A knife had been placed against one side of the box and a Courtavant type pin between the box and the badly preserved skull. A

▼ Fig. 2. A: Histogram showing the objects found in the box sets (© R. Peake). B: Different archaeological box sets: Migennes, inh. 298; Etigny, inh. 90; Marolles, inc. 5; Passy-Richebourg, inh. 7 (graphics by F. Muller; © M. Roscio).

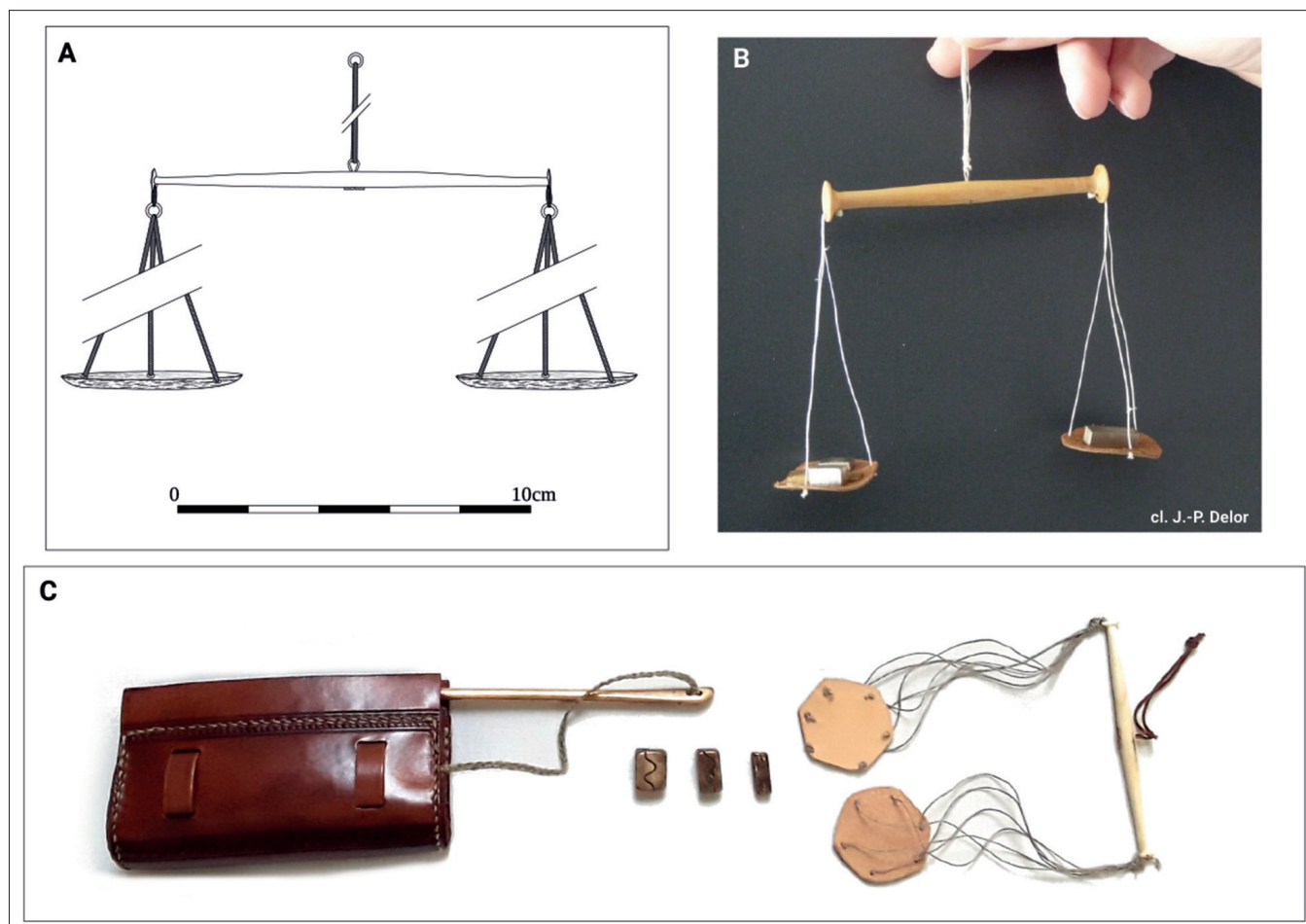


bronze razor with an openwork handle and ring was found next to the right humerus.

The probable male cremation no. 5 burial from the Marolles-sur-Seine “les Gours-aux-Lions”



▲ Fig. 3. A: Etigny – Le Brassot (Yonne), inhumation 90: plan, general view of the tomb and detail of the razor, the objects found in the tomb (© F. Muller). B: Marolles-sur-Seine – Les Gours-aux-Lions (Seine-et-Marne), cremation 5: representation of the urn, grave goods (MORDANT/MORDANT 1970, fig. 29-31; © M. Roscio).



cemetery, is located at the centre of a circular ditch monument (MORDANT/MORDANT 1970, fig. 1,E5). The burial pit contained a large pottery urn covered by a plate, which when removed revealed a number of small objects on top of the cremated bones (Fig. 3B). The objects were assembled in a very similar way to those of the Etigny burial with three aligned bronze tubes marking one side of a probable rectangular box. A small bronze dagger (analogue to the knife at Etigny) had been placed along one of the sides of the box, which contained almost identical items to those found at Etigny such as tweezers and a balance beam. However, here there were no obvious weights excepting three small fragments of gold and an amber bead that could have been used with the beam. The box also contained a small axe made from a dark green coloured stone (a probable touchstone), a fine grain sharpening stone, a chisel and two bronze fishhooks. A bronze razor with an openwork handle and ring similar to the one found at Etigny was placed next to the box probably in another box or in a leather pouch. Two pottery drinking goblets were also in the urn next to the box and a Courtavant type bronze pin twisted by its exposure to heat (from the funerary pyre) was found amongst the cremated bone fragments.

These two burials, one an inhumation, the other a cremation, share startling similarities in their grave goods and the way the objects were organised within the tomb. Both burials have the same box set containing weighing equipment and other items of personal value. Other than the initial treatment of the body, the only differing factor between the two is that the Marolles-sur-Seine cremation was located at the centre of a monument, a position generally reserved for the more important burials. This does not seem to be a discriminating factor in this case.

1.3. Characteristics and variability of weighing equipment

The balance beams found in the Seine-Yonne area are usually well preserved being made of animal bone or antler. The most common type is cylindrical in shape and perforated in the middle to accommodate a small bronze suspension ring (Fig. 4). The ends of the beam are either flared or have separate disks attached and are perforated to suspend the pans (ROSCIO 2018, fig. 162). All the known examples of this type are of similar form and size. A second type of beam, slightly larger and sturdier, was recovered from a burial (inhumation 298) at the Migennes cemetery. It consists of a decorated rectangular bar perforated at each end. For both types only the beam itself is preserved, the pans

▲ Fig. 4. A: balance beam; B: experimental balance beam made from bone with leather pans and vegetal threads (made by V. Lascour); C: experimental leather zip pouch with fastening of leather loops and bronze baton inspired by the zip pouch found in the Middle Bronze Age Danish tomb of Hvidegard (made by J. Paske), bone balance beam (made by V. Lascour) and three bronze weights (made by A. Legras and K. Morin) (© C. Mordant) (cf. BOULUD-GAZO/PEAKE 2020, fig. 4-7).

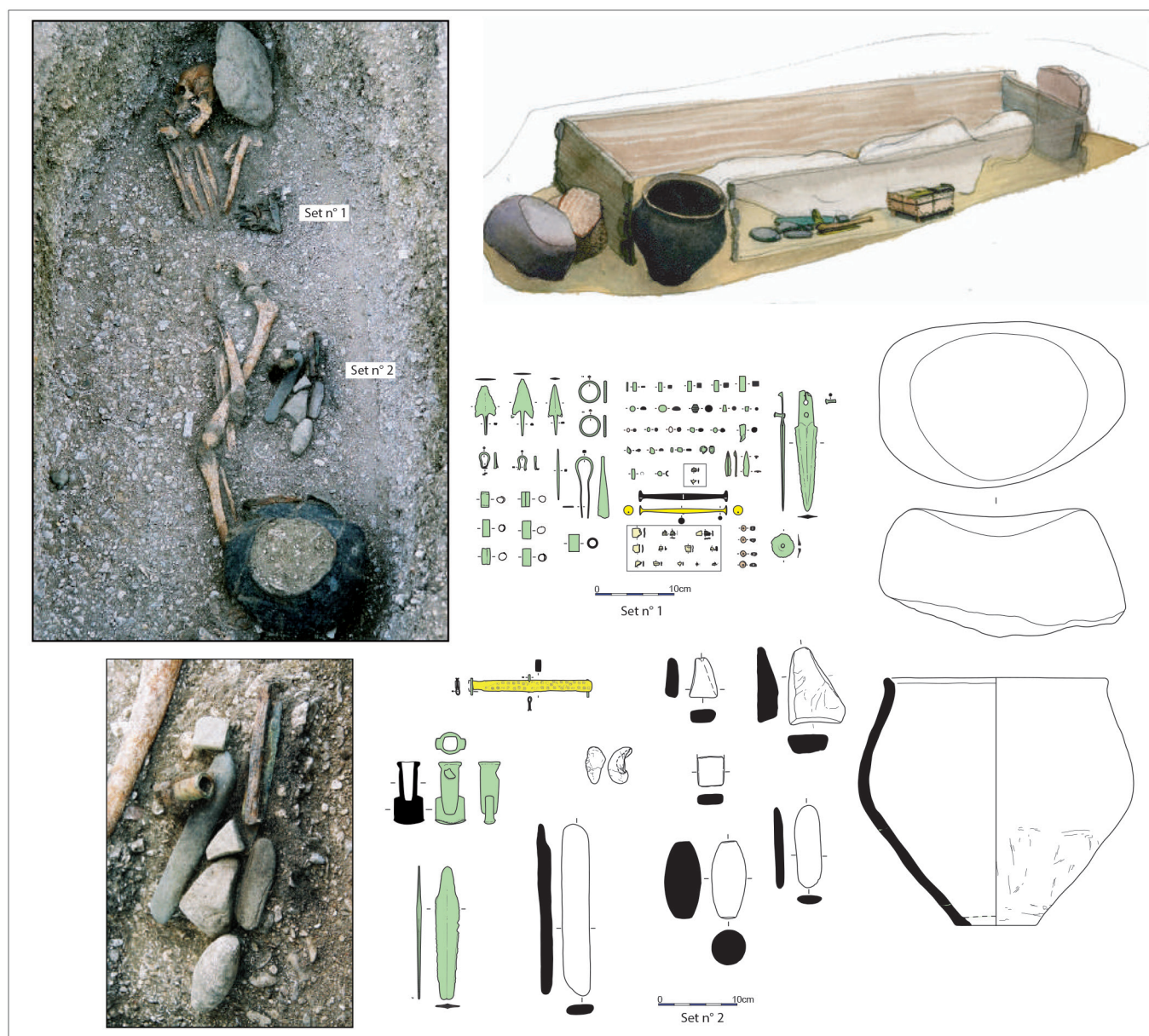
(and the thread attaching them to the beam) are not, as they were probably made from a perishable material such as leather, bark or even cloth. This is in stark contrast with the weighing equipment from Mycenae or found on various sites in the Aegean, where pairs of bronze pans with their small perforations are preserved in tombs, whereas the beams, which were probably made from wood, are not (MICHAILIDOU 2019, fig. 6, 8-9).

The weights vary in shape and size. There are the rectangular metal weights that are part of a large normalised series, found all across Europe (PARE 1999; IALONGO/RAHMSTORF 2019, fig. 5-7). Then there are the more unorthodox weights, which are recycled objects or fragments of objects such as small fragments of gold and bronze, the head or the collar of fragmented bronze pins, small amber beads.

The weighing equipment was probably stored in a box or perhaps a pouch with a standard array of

other objects such as bronze tweezers, small tools such as chisels, awls, fishing hooks or arrow heads. The two or three bronze tubes, which are generally aligned on one side of the group of objects, are interpreted as the container's fastening. The tubes would have been alternately attached to each side of the opening so that when closed the tubes would align allowing a wood or bone baton to be passed through effectively closing the container (Fig. 2, 4). In most of the burials a bronze dagger, knife or even a razor was placed near to or against the box or pouch containing the weighing equipment. A preserved zip pouch, probably very similar to the containers found in the Seine-Yonne valley tombs, was found in a 14th-12th century BC burial from Hvidegård (Zeeland, Denmark) in the middle of the 19th century. The leather purse, which was attached to a belt, had a similar fastening of alternate leather loops through which was passed a pin (HERBST 1848; GOLDHAHN 2012). This

▼ Fig. 5. Inhumation 298 from the Migennes "Petit Moulin" cemetery (Yonne). General and detailed views of set no. 2 (© F. Muller); objects from the tomb (F. Muller; © M. Roscio); reproduction of the tomb (watercolour by J.-P. Delor).



belt purse contained a heterogeneous group of objects such as a flint dagger used as a strike-a-light, tinder, bronze tweezers, a dagger and a razor, an amber bead, a shell, various bones from small animals and a collection of pebbles. The contents are interpreted as belonging to a medicine man or shaman. J. Goldhahn mentions that over thirty similar finds have been recorded throughout Denmark, the belt purses are often found in burials containing swords or daggers, which suggests that their bearers would have belonged to the ruling social class of Bronze Age society. Could a similar interpretation apply to the bearers of weighing equipment from the Seine-Yonne valleys? On the one hand, weighing equipment appears to be part of a collection of objects and tools collected and carefully kept during the owner's lifetime, giving an insight into a specific individual's personal history. On the other, this equipment enabled its users to precisely weigh and to control the weight of small quantities of substance, bringing attention to a very specific skill set acquired by just a small number of people (of high status?) within Late Bronze Age society.

1.4. The unprecedented objects found in the Migennes burial 298

The inhumation 298, part of the northern group of inhumations and cremations that make up the early Late Bronze Age cemetery of Migennes, is exceptional by its wealth and by the variety of objects that make up its grave goods (ROSCIO *et al.* 2011). No features such as a monument or even a surface marker indicated the exceptional nature of the grave or its contents before excavation. However, this is the burial of a remarkable high status individual, who played a specific role within early Late Bronze society of the Seine-Yonne valleys.

The inhumation, housed in a wood lined burial pit, is that of an adult male in a lateral position. A large pot was placed at the feet and two groups of objects, each containing a balance beam were deposited on the left hand side of the body (Fig. 5). The first group next to the waist included a typical cylindrical bone beam with flared ends and several weights, as well as fragments of gold, bronze tweezers, a dagger and three arrow heads minus their shafts. The objects had been placed in a small box, with an elaborate fastening as described above made up of six bronze tubes. The second group, found further down the body is a collection of larger objects and includes a rectangular shaped balance beam made from antler and decorated with eyespot motifs, a socketed bronze hammer, a small bronze dagger, stone tools for abrasion and a smooth spherical shaped weight made from chalk and weighing 270 g. A cushion stone made from sandstone and weighing 5.35 kg, had been placed at the foot of the grave, perhaps to wedge one side of the wood lining, mirroring a stone slab found at the opposite end of the pit.

The selection of objects found in this burial all pertain to the deceased's role and status in life. The arrowheads and the small daggers could be the modest accoutrements of a warrior/archer, whereas the other items are the tools of a craftsman. The hammer, the abrasive stone tools, the cushion stone all point to an expertise in bronze metalworking, the small gold fragments could indicate a knowledge of gold work. The balance beams and the collection of small weights show the person had expert knowledge of precise weighing, whereas the large stone weight indicates that a much larger balance beam made out of wood and unfortunately not preserved, could also have been part of the burial's equipment. This beam would have been similar to those seen depicted in the wall paintings of Egyptian tombs (MORDANT *et al.* in press, fig. 7). These larger beams must have existed locally to weigh masses of several kilos just as the smaller instruments were used to weigh just a few grams.

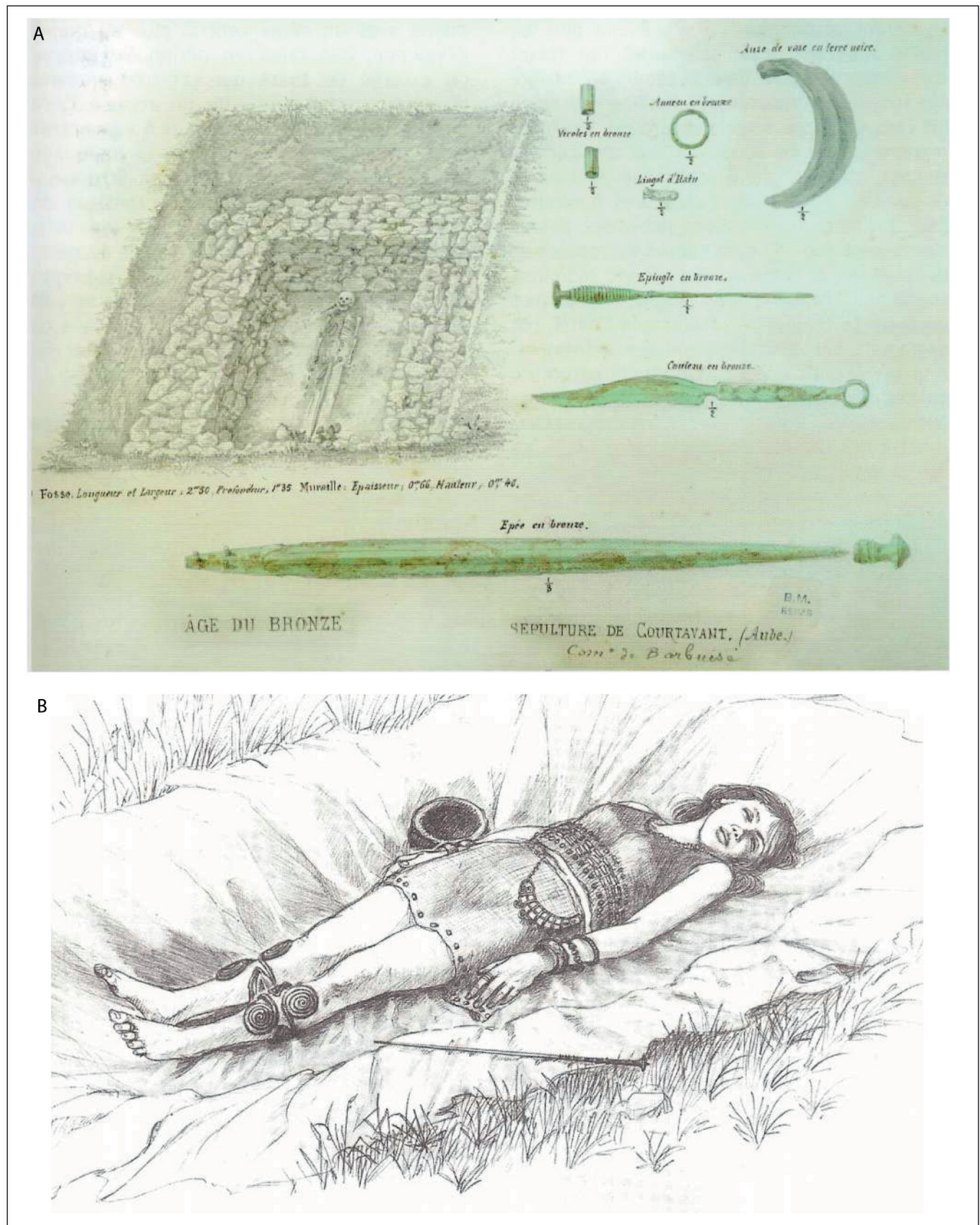
2. The social position of the bearers of weighing equipment

2.1. A hierarchical society led by powerful women and men

It is easy to read the composition and hierarchy of early Late Bronze Age society using the richly bestowed tombs of its privileged members. The famous tomb from the Courtavant cemetery, known as the Morel tomb, represents the masculine sphere with its Rixheim sword (Fig. 6A); the feminine sphere is represented by tomb no. 101 from the La Colombine cemetery with its wealthy bronze adornments including spiral leg ornament, solid bronze bracelets, a long bronze pin and the exceptional boar tusk and bronze net pendant (Fig. 6B). These weapons and ornate objects are indicators of wealth and status belonging to people from the highest rank of regional Bronze Age society. The distribution map of these rich tombs shows that they are mainly located in the valleys or clustered around the main river confluences (Fig. 7) probably at the centre of a modest territory controlled by this elite class, spanning no more than 20 km in all directions (MORDANT/GOUGE 1993, fig. 21-24). Two tombs at Migennes containing weighing equipment also contained swords, which leads us to presume that the bearers of weighing equipment were also part of this high ranking class that ruled Bronze Age communities in the area.

2.2. Who were the bearers of weighing equipment?

Even though we know little as to what was weighed and controlled by the bearers of weighing equipment, small amounts of gold, amber and the necessary amount of tin needed to be added to copper to make bronze seem likely candidates. If we consider this the case, then they were probably

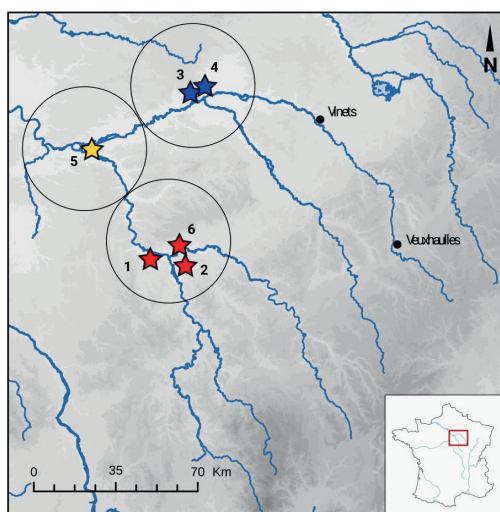


▲ Fig. 6. A: Inhumation of a sword bearer from Barbuise-Courtavant (Aube); lithography of the “Morel tomb” named after the archaeologist who discovered it (*Bulletin Monumental* 1875). B: Female inhumation 101 from Champlay – La Colombine (Yonne) (reproduction by G. Tosello).

working closely with goldsmiths and metalworkers, if they were not craftsmen themselves. In addition, they could have played the important role of intermediaries in the metal trade (copper and tin), perhaps responsible for maintaining a steady flow of metal to supply local activities of gold and bronze working. Organic substances such as drugs and medicines, used in pharmacy and by herbalists, could also have been weighed thus giving the bearer the role of shaman and the learned connoisseur of medicinal plants and remedies.

The Late Bronze Age balance beams were designed to be very versatile instruments. They were strong enough for regular use, easily weighing quantities of up to 100 g and due to the bone's rigidity could also be adapted to weigh small quantities with great precision. These technical capacities indicate that they could have been used for weighing out the necessary quantities of alloy needed for the manufacture of Late Bronze Age ornaments such as bracelets pins, rings, etc. as these objects rarely weigh more than 100 g. For the more precise weighing of smaller masses, the correct adjustment of the pans and the instrument's precision would have been ensured using the double weighing method. This enabled the weighing of very small quantities equivalent to less than a gram and could have been used for weighing medicinal substances (or drugs), or very small quantities of metal. This raises the question of whether the gold fragments found with the beams in the burials were small quantities of raw material or reference weights. Furthermore, gold is not the only rare material found in Late Bronze Age burials in the Seine and Yonne valleys. Amber, glass, as well as copper and tin are all exotic materials that were imported into area via a complex trans-European exchange network, in which as intermediaries, the bearers of weighing equipment could have played an important role.

This brief outline underscores the expertise of the bearers of weighing equipment, which includes a knowledge of weights and measures, referential units and absolute value as well as the ability to identify and value rare and expensive products – a specific skill set that would have been put to great use when trading. This learned status would have conveyed a certain amount of power, which opens up the debate on the status of these savants in Late Bronze Age society in relation to other high class individuals such as warriors? The warrior and the bearer of weighing equipment appear to have a similar ranking in funerary contexts: they are both buried with abundant grave goods including metal ornaments, their burials are housed in large chambers with an elaborate architecture and in some cases the burial is marked by tumulus. These features all convey their relative importance. However, with the exception of burial no. 251 from Migennes, which contains a balance beam and a Rixheim sword, the burials with



1 : Champlay "La Colombine"; 2 : Beaumont "Crôt aux Moines"; 3 : Barbuise-Courtavant "Grèves de Boulogny"; 4 : Barbuise-Courtavant "Grèves de Frécul"; 5 : Barbey "Les Cent Arpents"; 6 : Migennes "Le Petit Moulin". Vinets and Vauxhautes : female graves with spiral ended anklets.

Boar tusk pendant types :



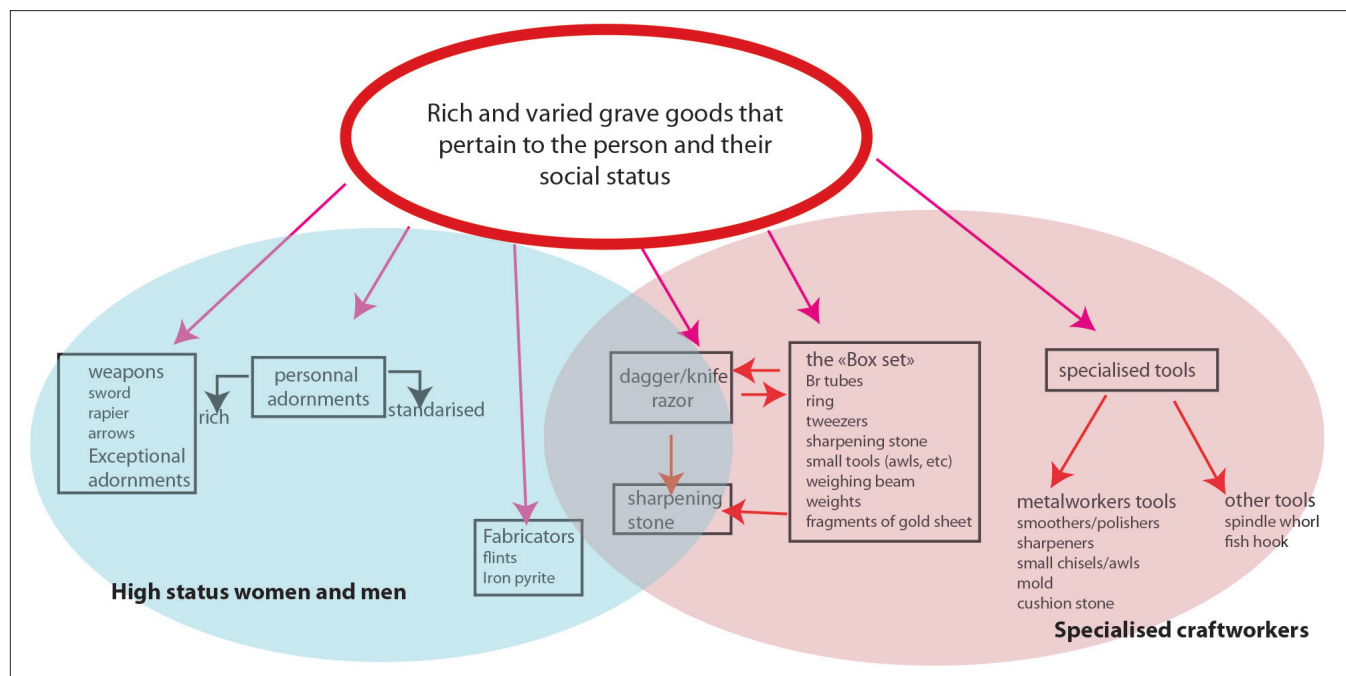
weighing equipment do not have the large weapons that are so emblematic of the warrior status in Late Bronze Age society. At best, they contain a small bronze dagger or a knife. The technical assemblage of tools (balance beam, goldsmith or metalworkers tools) found in the burials of the bearers of weighing equipment represents another aspect of Late Bronze Age society and bestows the image of an artisan specialist or "a man of science", with extensive knowledge of metalworking, but also capable of negotiating in the trade and exchange of materials as invaluable intermediaries. These people were in effect Late Bronze Age merchants (Fig. 8).

3. Why the cluster of weighing equipment finds in the south-east of the Paris basin?

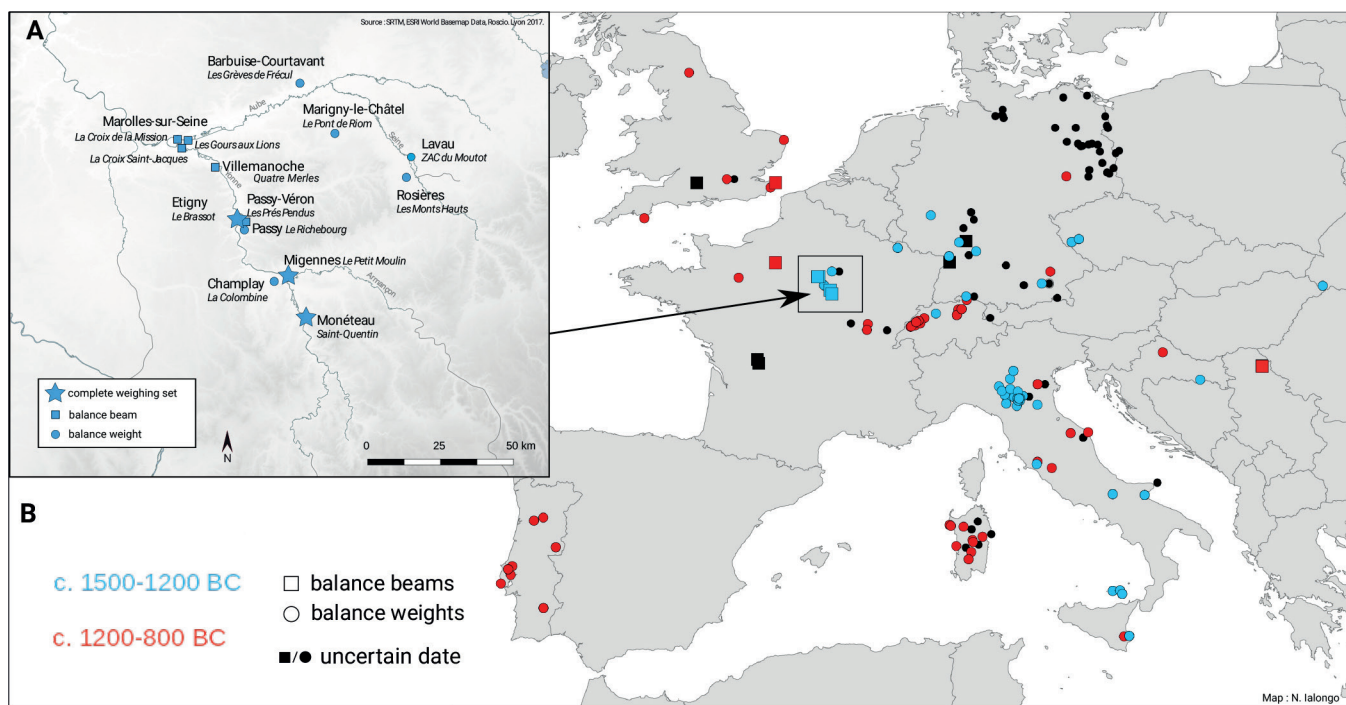
3.1. A notable cluster in the Upper Seine and Yonne valleys upriver from their confluence

The cluster of balance beams in the south-east of the Paris basin is noteworthy when considering the uneven distribution of weighing equipment across Europe (Fig. 9) (IALONGO/RAHMSTORF 2019, fig. 1, 6-8; MORDANT *et al.* in press, fig. 1, 7). This cluster can be linked to the relatively high population density at the beginning of the Late Bronze Age when the area showed a demographic surge due in part from the influx of migrants from the Upper Rhine valley. In addition, this area became a contact zone between its new inhabitants from

Fig. 7. Distribution map of the boar tusk pendants in the south-east of the Paris basin and the possible territories around the major river confluences: Seine-Aube, Seine-Yonne, Yonne-Armançon. Notice the variation in the pendants according to their geographic location (MORDANT/GOUGE 1993, fig. 20; © M. Roscio).



▲ Fig. 8. Proposed social pyramid of Late Bronze Age society (© R. Peake).

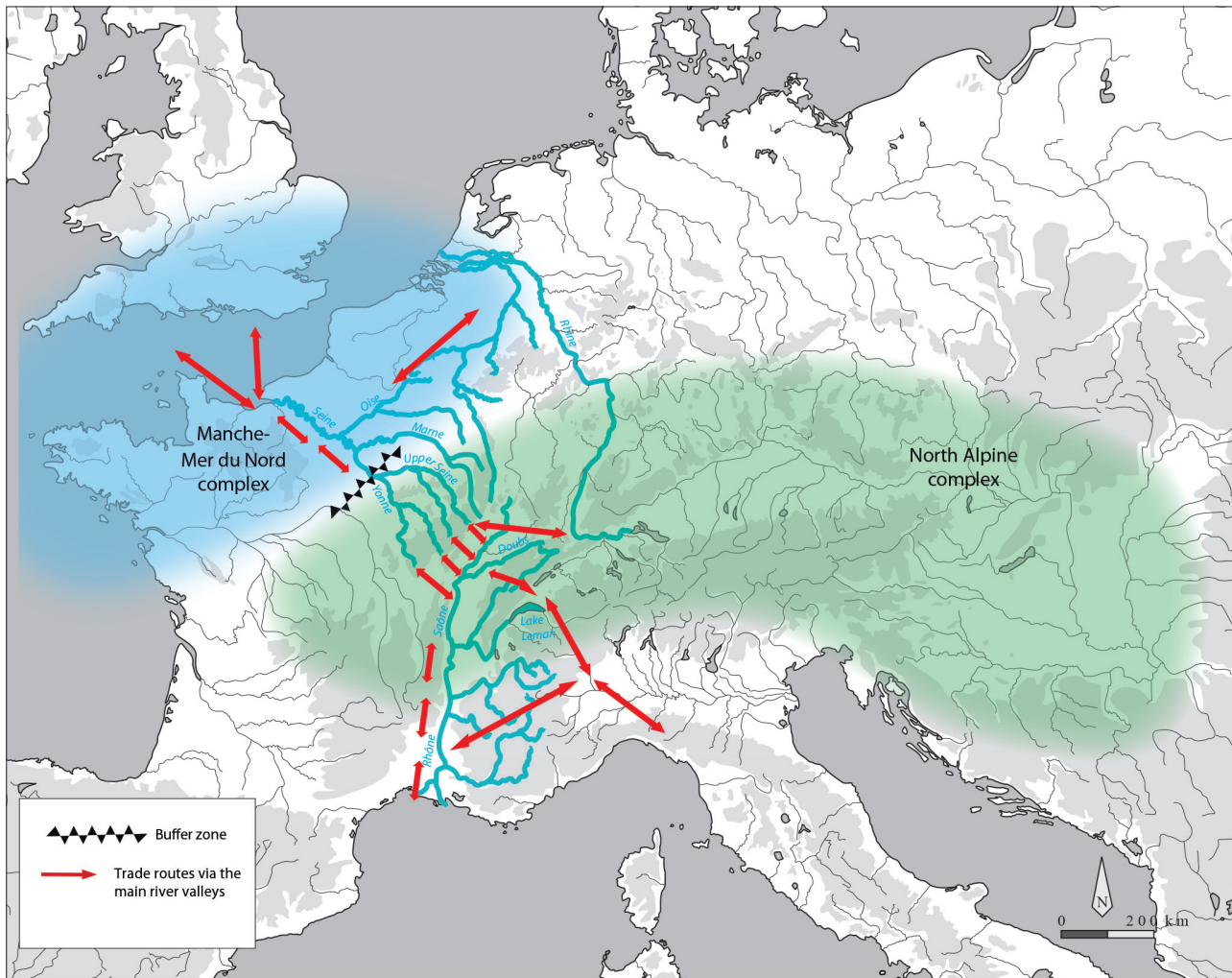


▲ Fig. 9. A: Distribution map of weighing equipment in the south-east of the Paris basin (© M. Roscio). B: Distribution of balance beams and weights in Europe (LALONGO/RAHMSTORF 2019, fig. 1).

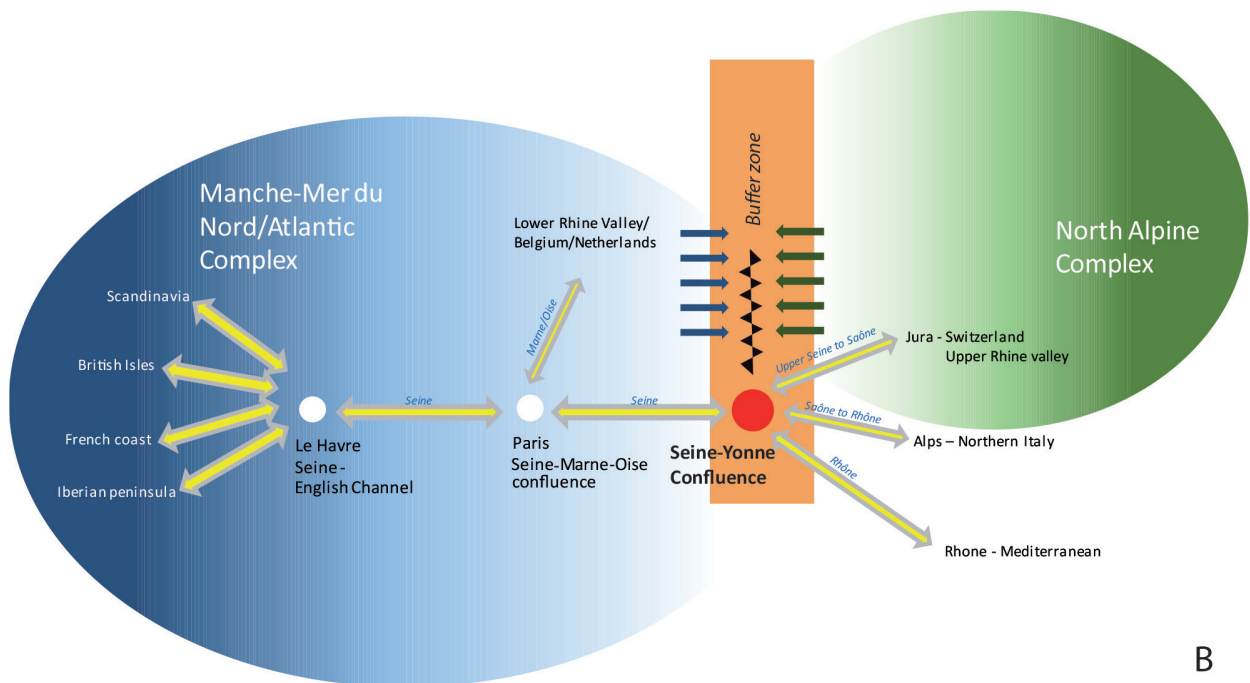
the East and the communities from the Atlantic-Manche-Mer du Nord complex, which would have led to a highly competitive cultural environment, this dynamic providing great economic prosperity (MORDANT 1989). Weighing equipment appears in burials during this very short period of the beginning of the Late Bronze Age to suddenly disappear during the following phase.

3.2. A « hub » in the Upper Seine valley?

The modern definition for a hub "the central and most important part of a particular place or activity" can be easily transposed in archaeology and is well adapted to the model that we would like to propose for the Seine and Yonne valleys. This area is fed by an extended hydrographical network that leads up to the convergence of the two major river systems



A



B

▲ Fig. 10. A: Hydrographic network and communication routes; B: proposed model of the Yonne – Upper Seine hub for the 14th-13th century BC. Note that the buffer zone located at the Seine-Yonne confluence moves further west towards Paris from the end of the 13th century BC onwards (© R. Peake).

of the Seine and the Yonne before flowing north-west towards the coast (*cf. supra*). This extensive river system provides the necessary means for the transport of raw materials and manufactured products, whilst allowing the free movement of people all of which transit via the Seine-Yonne valleys. The network allows movement eastwards towards the Upper Rhine valley, towards the Swiss Plateau and northern Italy via the Jura and the Alps, southwards towards the Mediterranean and westwards towards the Channel, the British Isles and Ireland (Fig. 10). The flux of trade and people through the Seine-Yonne area would have stimulated its development and prosperity at the beginning of the Late Bronze Age. It is a system that relies on the implicit mobility of people and can perhaps be compared to the medieval “foires de Champagne” (12th-14th century), the large regional fairs that took place in and around the town of Troyes, located upriver from the Seine-Yonne confluence in the Champagne area. These fairs boosted the local economy of the area for at least 200 years (YANTE 2019) and would have attracted processions of merchants selling regional and exotic products travelling a similar route via the Seine as their Bronze Age counterparts. The use of a standard weighing system and the protection of merchants by the local elite would have facilitated and amplified trade and exchange during the Bronze Age in a similar fashion as has been documented for the medieval period. These Bronze Age weighing sets were therefore part of the many technical innovations used for pan-European trade during the early Late Bronze Age with the Upper Seine valley playing a major role.

The fact that Seine-Yonne valleys represent the geographical frontier between the North Alpine and Atlantic/Manche-Mer-du-Nord cultural complexes could explain the cluster of weighing instrument finds that point to a potential trade hub in this area. Within this context, the bearers of weighing equipment or itinerant merchants would have had the authority to move from place to place in order to facilitate trade, where the regulation of the movement of people and objects would have greatly contributed to the large surge in economic growth witnessed in the area. In terms of middle and long distance relations, the merchants would also have been the main actors of the cultural dynamics between North Alpine and Atlantic/Manche-Mer-du-Nord complexes as their knowledge and power would have allowed them to easily navigate from one regional court to another. Their tombs hold a similar status to those of the traditional regional elite underlining their importance in Late Bronze Age society. Their graves goods notably those found in the Migennes tomb no. 298 with its array of exotic objects suggest that they travelled, most certainly over long distances.

Conclusion

The exceptional balance beams and weights that belonged to people of a certain social rank make up a sophisticated standard and “international” weighing set that probably originated in the Mediterranean area. A cluster of these sets has been found in the Upper Seine valley, an area of transit of people and goods from different regions of north eastern and southern Europe towards the Channel and the Atlantic coast and vice versa. This model can be described as a socio-economic hub centred around the Seine and Yonne valleys, the success of which was largely due to the extensive hydrographic system of the Upper Seine valley and the context of cultural competition between the North Alpine and Atlantic/Manche-Mer-du-Nord cultures, which came to a head during the early Late Bronze Age in the Seine valley area.

The presence of these weighing sets is synchronous with a phase of economic and social success that lasted for several generations between the 14th and the 13th century BC in the south-east of the Paris basin. The weighing equipment subsequently disappears from funerary contexts and the area’s vitality is substantially diminished from the 12th century BC onwards with the arrival of the new “Rhin-Suisse-France oriental” cultural group. These new influences pushed further west and north, with the contact zone with the Atlantic/Manche-Mer-du-Nord culture establishing itself further upstream nearer to modern day Paris. This geographical adjustment leads to profound changes in the trade network with the area of the Seine and Yonne valleys losing its dynamic and socio-economic vibrancy. However, the disappearance of such a sophisticated instrument as the weighing beam from funerary contexts is surprising as the middle phase of the Late Bronze Age (12th-10th century BC) is no less dynamic in terms of metalworking, gold working and middle and long distance contacts. The disappearance could be due to the fact the instruments were no longer placed in tombs or that they were simply no longer preserved during a period when cremation becomes the dominant funerary practice. It could also be linked to a more widespread use of weighing equipment with beams being made from perishable materials such as wood that would not have survived. Also, a more extensive knowledge of weights and measures would have led to the bearers of weighing equipment holding less power and being gradually assimilated into the local population.

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International trade in Greater Mesopotamia during late Pre-Sargonic times

The case of Ebla as illustrated by her participation in the Euphratean timber trade

by PIOTR STEINKELLER

International trade, timber, the Euphrates River, Ebla, Syro-Mesopotamia, Early Bronze Age

The cuneiform sources stemming from the Royal Archives of Ebla (Tell Mardikh in northern Syria) offer unusually rich information on the organisation and workings of the international trade in Greater Mesopotamia at ca. 2350 BC. Through the use of relevant textual data, this communication aims, first, to define the place of Ebla within that trade network, and to identify her main imports and exports. It is argued that foreign trade constituted one of the main sources of Ebla's total income. Second, one particular item traded by Ebla – timber – is studied in detail. Among the issues treated here are: the types of trees imported and exported by Ebla; the points of origin of these trees; the geographical routes over which timber was brought to Ebla and then resold to other places; and the logistics of its transportation. Finally, the question of the value/prices of Ebla's timber is considered.

Ein Beispiel des internationalen Handels im mesopotamischen Großraum während der späten vorsargonischen Zeit: Ebla und der Holzhandel auf dem Euphrat

Internationaler Handel, Holz, Euphrat, Ebla, Syro-Mesopotamien, Frühbronzezeit

Die Keilschrifttexte aus den königlichen Archiven von Ebla (Tell Mardikh im nördlichen Syrien) bieten ungewöhnlich reichhaltige Informationen zur Organisation und Durchführung des internationalen Handels im Großraum Mesopotamien um ca. 2300 v. Chr. Durch die Nutzung der relevanten textlichen Daten zielt dieser Beitrag erstens darauf ab, sowohl die Rolle von Ebla innerhalb des Handelsnetzwerks als auch die hauptsächlichlichen Importe und Exporte zu bestimmen. Dabei wird argumentiert, dass der Außenhandel die hauptsächlichliche Quelle von Ebla's Einkünften darstellte. Zweitens wird eine bestimmte Ware, die von Ebla gehandelt wurde, im Detail untersucht: Holz. Dabei werden folgende Themen behandelt: die importierten und exportierten Baumarten; die Herkunft dieser Bäume; die Strecken, durch welche das Holz nach Ebla gebracht und dann an andere Orte verkauft wurde sowie die Logistik des Transports. Anschließend wird der Frage des Wertes bzw. des Preises von Ebla's Holz nachgegangen.

1. Introduction

This paper investigates some aspects of the international trade in Greater Mesopotamia, during the late Pre-Sargonic period (*ca.* 2400-2350 BC). Its specific focus is the territorial state of Ebla (modern Tell Mardikh), which was situated in northern Syria, some 55 km to the southwest of Aleppo.

The choice of Ebla as the subject of this investigation is dictated by the nature of textual evidence presently available. Numbering some 1,800 complete tablets and as many as 4,700 fragments, the royal archives of Ebla constitute the largest assemblage of economic records surviving from late Pre-Sargonic times. Even more important is the fact that foreign trade and inter-regional contacts more generally are by far the commonest issues dealt with in Ebla sources. In fact, it may be said that foreign affairs take the main stage in these materials. Because of this, Ebla records dramatically differ from the other corpora of Pre-Sargonic economic tablets, in which foreign trade is hardly mentioned at all.¹ As such, the Ebla archives constitute a completely unique source of information on international trade in the period in question – or, for that matter, for the entire 3rd millennium BC.

This preoccupation with commerce-related matters is probably not accidental, since it is abundantly clear that Ebla was a major trading power in her own right. This is demonstrated, first of all, by the enormous scale of the commercial network she was an integral part of. That network embraced the entire western half of Middle Asia. If only Ebla's *direct* commercial contacts are considered, included among her partners were Egypt, all of northern Syria, western Anatolia, the Balikh and the Khabur Valleys, the foothills of the Zagros, and the upper course of the Euphrates, from its sources in Anatolia down to the city of Kiš in northern Babylonia.

Thanks to their great number and the exceedingly detailed information they contain, Ebla sources offer an incredibly rich picture of the international trade system, as it operated in Greater Mesopotamia at *ca.* 2350 BC. That system was astonishingly advanced, being, in terms of its sophistication, on par with what one finds, in the same geographical area, during the first half of the 2nd millennium BC, as exemplified by such textually documented cases as the trade between the city of Assur and Anatolia, as well as by that between the city of Ur and the Persian Gulf. Ebla sources employ a very extensive commerce-related nomenclature, which knows a variety of terms for merchants, merchandise transporters, and trading expeditions, and which identifies numerous types of commercial instruments,

such as the various forms of merchandise consignments, transportation and custom fees, and river-crossing tolls. It also names various weighing and measuring systems, demonstrating that the merchants were familiar with the weights and measures unique to particular localities and that they could easily convert from one system to another.

Ebla documentation offers a vivid picture of the constant movement of hundreds of merchants, who traveled incessantly throughout the region in question and were often organised into family-based professional guilds. There is also extensive evidence of merchant colonies or enclaves. Situated at strategically important points, such settlements could contain hundreds of traders and support personnel.² While merchants worked largely for themselves, they could also serve on behalf of state institutions. Their activities were regulated by international treaties, which stipulated their professional behavior and legal status while conducting business in foreign territories. Interestingly, there is evidence that tribal groupings were actively involved in long-distance trade as well.³

Surprisingly, in spite of their richness, and their paramount importance for our understanding of the nature and mechanics of Pre-Sargonic international trade, these materials have not so far been subjected to a systematic monographic study. The only exceptions of any significance here are the general discussions of this topic by Frances PINNOCK (1984; 1985; 1990) and Alfonso ARCHI (1993a), dating to the 1980s and 1990s, and thus to the very beginnings of Ebla research. Subsequently, Maria-Giovanna BIGA (2012; 2016; 2017) has devoted several articles to the trade between Ebla and Egypt. And finally, there is a recent (but yet unpublished) PhD dissertation by Ryan WINTERS, entitled “Negotiating Exchange: Ebla and the International System of the Early Bronze Age” (2019). While not the definitive study of Ebla trade, this work makes important inroads toward that goal.

The objectives of this paper are much more modest, for it studies and, hopefully, elucidates only one aspect of Ebla's international trade. Having drawn an outline of the trade-network Ebla was part of and briefly identified her main exports and imports, I will concentrate on her involvement in timber trade. Two main questions will be considered here: (1) from where and what types of timber did Ebla import; and (2) what were the logistics of that timber's acquisition and transportation.

1 The case in point are the Pre-Sargonic sources from Girsu. While numbering some 1,800 tablets (and so being numerically similar to the Ebla corpus), these sources contain exceedingly few references to foreign trade and international contacts, their nearly exclusive concern being Girsu and its immediate dependencies.

2 A particularly well-documented enclave of this type, belonging to Mari, existed at Tunip. See n. 8 and 52.

3 This is particularly true of the entity called IB.MAH^{ki} (usually read Ib-al^{ki} in Ebla studies), which clearly represented semi-nomadic pastoralists operating in the territories to the south of the state of Ebla. For IB.MAH^{ki}, see, most recently, ARCHI 2019, 153-162. Note, however, that the alleged “military campaigns” (nig₂-kas₂), so Archi *ibid.*, more likely were simply “commercial expeditions”. See BONECHI 2020, 120-121.

1.1. The role of the Euphrates as the main commercial route of Greater Mesopotamia

In addressing the question of international trade in late 3rd millennium Greater Mesopotamia, one needs to emphasise, first of all, the paramount role played in it by the Euphrates River, which served as the main commercial and cultural highway of this entire geographical region. Already in Pre-Sargonic times – and probably much earlier – this highway had an extension in the east, in the form of a sea route. Starting at the head of the Persian Gulf, that route ran along the gulf's coast via Tilmun (modern Bahrain) and Makkan (modern Oman), passing then through the Strait of Hormuz and reaching eventually the coast of Meluhha (Indus Valley). Another extension of this network existed in the west. This predecessor of the classical *Via Maris* began on the Amuq Plain (also known as the Plain of Antioch) in northern Syria, continuing along the Mediterranean coast to Palestine and from there to Egypt.

There is every reason to think that much of this route was fully operational already in Late Uruk times (3600-3100 BC), and that the region in question, which extended from Anatolia and Egypt in the west to the Indus Valley in the east, already then displayed a high level of commercial and cultural connectivity. However extensive these connections may have been, it was only with the advent of the Sargonic kings and their territorial conquests that a fully integrated commercial network had been put in place.

In view of these facts, the Euphrates played a role that was not unlike that of the Silk Road of later times. Very significantly, the Euphratean commerce involved little direct trading; it was essentially of the intermediary type, with the Silk Road again offering an obvious analogy. The economic life of the states bordering on the Euphrates depended directly on its commerce, and this fact determined the nature of their mutual relationships. The single most important fact that this situation dictated was that the commercial traffic on the Euphrates move freely and uninterrupted all the way from northern Syria to the Persian Gulf. In other words, the economies of the Euphratean states formed a highly interconnected and balanced system, which took the form of a chain of intermediaries. This mutual interdependence and high connectivity were tacitly accepted by the states belonging to this chain, since the fortunes of all of them rested on the fact that the goods sent on the Euphrates in northern Syria, let's say in Emar (modern Tell Meskene), could reach Ur in southern Babylonia. And conversely, that the merchandise coming from the Persian Gulf could travel up the river all the way to northern Syria and beyond. While taking this fact for granted, the Euphratean powers at the same time competed among themselves for the control of key traffic junctions and lesser intermediaries in order to increase their profit margins. Without any

question, the two main and most contested communication points on the Euphrates were the cities of Sippar (modern Tell Abu Habba) and Tuttul (modern Tell Bi'a in Raqqa). Situated at the point where the Euphrates and the Tigris systems joined together and at the inlet of the Balikh River respectively, these two locales served as natural gateways to Upper Mesopotamia and beyond.

The Euphratean trade flourished already in Middle and Late Uruk times (second half of the 4th millennium BC), which saw the phenomenon of so-called "Uruk Expansion". During that time, the polities of southern Babylonia established an elaborate network of commercial enclaves, which embraced northern Mesopotamia, northern Syria, and eastern Anatolia, as well as significant portions of the Iranian Plateau. As astutely observed by Marcella FRANGIPANE (2009), in the west, the Uruk enclaves concentrated primarily along the Euphrates, with those situated on the Tigris being relatively few and unimportant. This fact alone demonstrates the paramount importance of this commercial route. As indicated by the presence of cedar, eastern Mediterranean pine, juniper, and elm among the materials recovered from the precinct of Eanna at Uruk, which date to the second half of the 4th millennium, the procurement of timber from northern Syria and Anatolia must have been one of the main motivations behind the "Uruk Expansion" (HEUSSNER 2015, 25-27).⁴ It has been estimated that the construction of only one of Uruk's monumental buildings (the so-called *Kalksteintempel*) required between 3,000 and 6,000 linear meters of beams (MARGUERON 1992, 87-90).

Some 600 years later, a hymn to the sun-god Šamaš stemming from Kiš sings praises of the Euphratean trade:

He (*i. e.*, Šamaš) established soldiers in the foreign lands; he gave (those lands) to the travelling merchants; the travelling merchants brought silver and lapis lazuli from the foreign lands; they went to the "Cedar Forest"; one proudly decorat-

4 The earliest historical evidence of such ventures dates to the reign of Sargon. Two tablets from Adab refer to the trip undertaken by the governor of Adab named Mes-kigala to cut timber in the "Mountain of Cedar": Mes-ki-gal-la ensi₂ Adab^{ki} x [...] kur ^{gi}eren kud-ta im-gin-na-am₃ gir₃-gin-na Ur.^{dc}Suen, "when Mes-kigala, governor Adab ... came from the felling (of trees) in the 'Mountain of Cedar'; the trip of Ur-Suen" (CUSAS 11 165 ii 2 – iii 5); Mes-ki-gal-la] en[si₂] Adab^{ki} kur ^{gi}eren-t[a] im-gin-na-am₃] (TCBI 1 23 ii 3 – iii 2). See further FRAYNE 2008, 33-34, Mes-kigala line 3': kur ^{gi}eren-ta, which probably refers to the same event (*cf.* MARCHESI/MARCHETTI 2011, 155 n. 2). This trip was either part of Sargon's conquest of that region or a later, independent undertaking. As well known, an expedition to the "Cedar Forest" is also famously described in the "Gilgamesh Epic". But, even if Gilgamesh was a historical figure, it is unlikely that any of the Pre-Sargonic rulers of Babylonia could have been able to launch an expedition to the Mediterranean. Therefore, this story either preserves the memory of the "Uruk Expansion" or is, more likely, a reflection of the Sargonic exploits in that region.

ed the spires of the temples with the pure woods: fir, cedar, and cypress; aromatic resin/oil, olive oil, and honey, the riches of the travelling merchants, (and) the “smoke of the gods”: juniper, *kukrum*, and the ... aromatic, the products of the foreign lands, he caused to be hauled on his rafts/barges.⁵

The Pre-Sargonic sources from Ebla document the existence of an extensive trade network along the Euphrates, particularly along the stretch between Mari and Tuttul. This network extended deep into the valleys of the Khabur and Balikh rivers, reaching as far as Nagar and Harran respectively. For example, a document concerning the commercial activities of a certain Gida-na'im describes the transportation of cattle and salt on boats between Mari, Tuttul, and Harran (MILANO 2003). The use of boats and rafts to transport merchandise over the Euphrates is also documented in the Pre-Sargonic sources from Mari and Ebla (see under 2.6.).

The importance of the Euphrates as Babylonia's main commercial route continued in the 2nd millennium BC. There even existed a specific term for this trade, which was “Euphrates commercial venture” (*ḥarrān Purattim*). For example, we find this term in the Old Babylonian commercial agreements from Babylon, where large volumes of silver (5 ½ minas in one case) are consigned for this form of trade (VAS 22 35:1-2, 39:1-2, 40:1-2, 44:1-2, 49:1-2).

There is also evidence of the existence of tolls or fees that the various members of the Euphratean network collected for the passage of commercial goods through their territories. Importantly for the purpose of this paper, such an impost, called a “Euphrates toll” or “tithe” (zag-10 KIB^{gunū}.NUN.A), is documented at Ebla, in a text detailing the injustices suffered by the Ebla merchants while conducting trade with Mari (ARET 13 15, discussed under 2.6.). Another Ebla source, the so-called “Treaty between Ebla and Abaršal”, mentions addir, “river-crossing fee on great boats”.⁶ Similar payments, called *miksu*, “custom dues”, and *nēbertu*, “river-crossing fee”, are later attested in the Old Babylonian texts from Mari and a Middle Babylonian source from Alalakh (modern Tell Atchana on the Orontes in northern Syria).⁷

5 AGA₃US₂ KUR.KUR KI.GAR GA'EŠ MU.NA.SUM GA'EŠ KUR<.KUR> ZA.GIN₃ ù KUG.BABBAR I₃.DE₆ TIR / ⁶³KIRI₆ EREN MU.DUDU GIŠ SIKIL TASKAR-IN EREN ŠUME ⁶³URIN ZE₂ E₂ IN.NA.DU₇ ga-ba-zu I₃.IR.NUN I₃.GIŠ LAL₃ SAG₄ GA'EŠ.GA'EŠ I₃.NE DIN-GIR.DINGIR ⁶³ba-ra ŠIM.GUR₂.GUR₂ NI.SI GUR₂.GUR₂ NIG₂ KUR GI/ u₉-sa-dè-da AD-su₃/MA₃.GUR₈.NA (OIP 99 326 ii 8 – iii 5 + variants from ARET 5 6 iii 2 – iv 5). Cf. KREBERNIK 1992, 72-86; STEINKELLER 2013a, 149, n. 72.

6 ARET 13 5 rev. v 9 – vi 3, discussed under 2.6. This passage also names another fee, called zi-kam₄ (meaning uncertain).

7 For the Mari examples of *miksu*, all of which concern tolls on boats, see CAD M/1 128 under *makāsu*, and CAD

1.2. The main participants of the Euphratean trade

During the late Pre-Sargonic period – and that is the time-frame of this contribution – the dominant role within the Euphratean system clearly belonged to the states of Kiš (modern Tell al-Uhaimir) and Mari (modern Tell Hariri). Unfortunately, our information on Kiš during that period is practically non-existent, though it is certain that the possession of the region of Sippar – whenever this was the case – put Kiš in total control of the commerce coming from the north on the Euphrates, the Tigris, and the Diyala rivers to all points farther south.

In the case of Mari, we are considerably better informed. It is known that she controlled the stretch of the Euphrates from Tuttul in the north to as far as the environs of Sippar in the south. During the period of the Ebla archives, Mari remained firmly in charge of Tuttul, which allowed her to spread her influence deep into the Balikh Valley. At times, she may have succeeded in including Sippar within the sphere of her political influence, though that city usually remained in the hands of Kiš. Further, it appears that Mari controlled also the lower reaches of the Khabur region.

Although I have repeatedly used the word “control” to describe Mari's dominance over the middle course of the Euphrates, it would be incorrect to think that this “control” involved territorial possession and the direct exploitation of natural resources, whatever they may have been. As far as our data permit to ascertain, Mari's sole objective in that regard was to maximise her profits from the Euphratean commerce. This she accomplished either directly, by establishing trading outposts at key traffic junctions or even by outright control of such places (and here the case of Tuttul comes to mind); or she did it indirectly, by forcing the various intermediaries to share their profits from duties on traded goods. In fact, one finds Mari merchants operating throughout the region in question⁸, and the general impression is that Mari nearly succeeded in monopolising the commerce along the stretch of the Euphrates between Tuttul and Sippar.

In my opinion, it is quite unlikely that Mari maintained any permanent military presence at key

M/2 65 under *miksu* b). For *nēbertu* at Mari, see ARM 9 257:6: 2/3 MA.NA 2 GIN₂ KUG.BABBAR ša ne-bi-ri-tim (following 1/3 MA.NA (KUG.BABBAR for) PN MA₂.LAH₄). For Alalakh, see AIT 108:3-12: “As for the donkeys concerning which one has complained to PN (= the king), release them and do not collect the toll (due on them); when PN arrives there, clear them of obligation in lieu of the river-crossing fees (already paid) on them”, ANŠE.MEŠ ša PN ša a-na ša-a-šu i-dab-bu-bu muš-šir-šu-nu-ma ù mik-sa-šu-ni la te-le-eq-qè ù e-nu-ma PN₂ aš-ra-nu i-il-li-kam ù zu-uk-ki-šu-nu ki-i ni-bi-ri-ti-šu-nu.

8 There is extensive evidence that Mari possessed a large merchant colony in Tunip, which was situated in the Orontes region (possibly being identical with modern Tell Asharneh in the southern Ghab Valley northwest of Hama). This operation may have numbered as many as 490 traders (lu₂-kar), their wives, and support personnel. See BONECHI 2016a, 48-51, 86-87; ARCHI 2018, 34, 40.

traffic places – not even at Tuttul. It was not until the reign of Naram-Sin of Akkade that the economic domination would be secured through the means of permanent military garrisons. But even in the Sargonic Empire, the control of the periphery did not involve outright territorial appropriation and direct exploitation of natural resources; the objective, as earlier, was to maximise profits from the intermediary trade.

The northern limit of Mari's sway over the Euphrates Valley was marked by the polity of Manuwat. This client of Mari likely lay just north of Tuttul. It was at Manuwat that Ebla's sphere of influence began. From there, it extended northward as far as the kingdom of Abaršal.⁹ One of the major points that Ebla controlled (at least intermittently) along that stretch of the Euphrates was the city of Emar. It is highly likely that Ebla owned her own port in the Euphrates Valley, which was probably situated south of Emar. As was considered by various scholars, a likely candidate for this port is the place called MA₂.NE^{ki} (for this port, see under 2.4.).

While the Euphrates clearly formed the north-eastern border of the kingdom of Ebla, its other borders are more difficult to delineate. It appears that, toward the south, Ebla's territorial possessions extended all the way to Hama. It is likely that, toward the west, Ebla controlled some sections of the Orontes Valley, in particular the region where the city of Tunip was situated. Ebla's neighbors in the northwest were the kingdoms of Kakmium (in all likelihood identical with the Amuq Plain) and Aleppo (Fig. 1).

Having offered this description of Ebla's geographical situation, I shall now consider her role within the international trade network.

1.3. Ebla's involvement in long-distance trade

The first problem an evaluation of Ebla's role as a trading center must confront, is the fact of her being situated at a considerable distance from the Euphrates – ca. 140 km as the crow flies, along the line between Tell Mardikh (= Ebla) to Emar. Because of this, it does not immediately follow that she was a direct beneficiary of the Euphratean trade. But, as noted earlier, Ebla did enjoy access to the Euphrates. Moreover, it may be argued that her particular geographic position, rather than constituting a disadvantage, was a source of strength, for it placed her right smack at the crossroads of the main trade routes of the region, which led to Egypt (south), Anatolia (west), and Babylonia (east).

Then there is the issue of Ebla's wealth, which, as generally recognised, was very substantial. This wealth may have even been exceptional, at least as

seen from the perspective of contemporary Babylonia. The best proof of Ebla's prosperity are the huge volumes of silver and gold that formed her revenues. These could reach, over a period of three years, as much as 10,669 minas of silver and 1,858 minas of gold (MEE 10 28).¹⁰ Equally informative here are the figures of silver and gold that Ebla regularly sent to Mari, either as tribute or, more likely, as commercial capital. Thus, during the reigns of the Mari rulers Iplus-Il, NIzi, and Enna-Dagan, such deliveries amounted *in toto* to 2,188 minas of silver and 134 minas of gold.¹¹ As for the sources of Ebla's silver and gold, it is certain that these two metals were imported by her from Anatolia (see, provisionally, STEINKELLER 2016, 130-133).

Due to the great visibility of textiles in Ebla documentation, my teacher Ignace J. GELB (1986) speculated that the main source of Ebla's prosperity was her textile industry. Indeed, woolen textiles, felt, and wool figure very prominently in Ebla documentation. It is known that large numbers of textiles were produced at Ebla, both for internal consumption and for export, and that Ebla owned large flocks of sheep. However, since Ebla also imported significant volumes of textiles and wool – especially from Mari but also from Nagar in the Khabur region and even Armi(um) (in all likelihood identical with Cilicia) (BIGA 2011; 2014b, 176-177) – the precise contribution of the textile industry to her overall income is difficult to assess.¹² My personal feeling is that it probably was of secondary importance. However, this issue cannot be settled without a quantitative evaluation of all the relevant data, and such an investigation is yet to be undertaken.

There are strong reasons to think that of equal (if not of greater) importance for Ebla's economy was the production of olive oil. Indeed, extant sources document the existence of large plantations of olive trees within Ebla's territory.¹³ They also record huge volumes of produced olive oil. According to one source, Ebla's reserves of olive oil could reach as much as 330,000 l.¹⁴ Furthermore, it is known

⁹ While the location of Abaršal remains uncertain, it most likely lay north of Tuttul (Tell Bi'a near Raqqa) and roughly at the latitude of Aleppo. Here I follow WINTERS 2019, 13, map, 155-160, who additionally suggests identification with the modern site of Tell Banat.

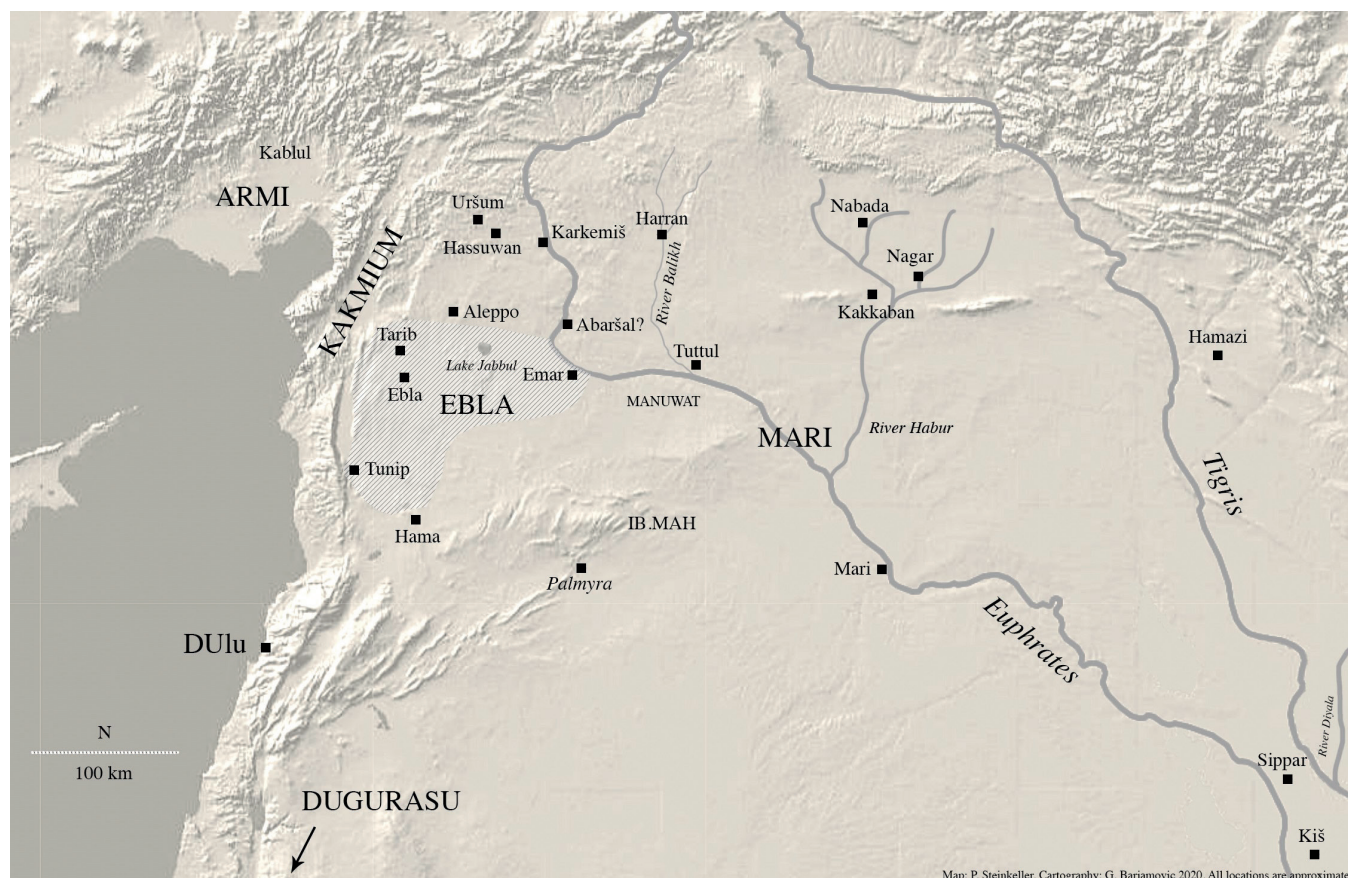
¹⁰ Discussed under 2.1. Similar large volumes of silver and gold are named in MEE 10 15 and ARCHI 1993b, 8-18, no. 2, discussed *ibid.*

¹¹ ARCHI 1981, 131-135, no. 1. See also the data collected in ARCHI 2016.

¹² PEYRONEL 2014b, 126, thinks that "the production of wool was fundamental for the economy of the kingdom [of Ebla]". In my opinion, this assessment probably is exaggerated.

¹³ MEE 7 45, a summary account of the olive tree groves within Ebla's territory, records 1,000 olive trees on a property measuring 2,260 units of land (gana₂-kešda-ki), 440 olive trees on a property measuring 1,110 units of land, and 500 olive trees on a property measuring 600 units of land. The same source lists (without naming the numbers of trees) additional 910 units of land under olive-oil cultivation, situated in four different places.

¹⁴ See ARET 7 148, which records 7,000 la-ha jars of olive oil stored in Ebla's countryside, and 4,000 la-ha jars of olive oil stored in Ebla's main administrative center or "palace". At the rate of 30 l per one la-ha (ARCHI 2016, 13), a total of



Map: P. Steinkeller. Cartography: G. Barjamovic 2020. All locations are approximate

▲ Fig. 1. Map of Greater Mesopotamia and northern Syria at 2350 BC.

that Ebla was an exporter of this product, especially to Mari (ARCHI 1991; SALLABERGER 2008, 98–100; BIGA 2014a, 179; WINTERS 2019, 114–117). Thus, according to one tablet, over a period of two years Ebla exported 32,430 l of olive oil to Mari.¹⁵ Commercial shipments of olive oil from Ebla to Mari are documented in several other sources (see further ARET 7 11 and ARET 3 15, discussed under 2.6.). It appears quite likely that at least some of this oil was subsequently resold by Mari to various cities in northern Babylonia. Besides Mari, Ebla sold olive oil also to DULu (probably identical with Byblos, see BIGA/STEINKELLER forthcoming) and Nagar in the Khabur region¹⁶ and very likely to various other places as well.

While both textiles and olive oil undoubtedly were very important for Ebla's economy, it may reasonably be argued, however, that her wealth derived primarily from her involvement in intermediary trade. I submit that because of her favorable

geographical situation and that as a result of her astute politics vis-à-vis the other dominant powers of the region (Mari, Emar, Aleppo, and Abaršal), Ebla had been able to become, however briefly, the center of an astonishingly large interregional trade-network. This network – which, because of its size, could even be described as global – embraced Mari, northern Babylonia, and the Iranian Plateau in the east, Anatolia, Cilicia, and the Amuq Plain in the west, the Khabur region and the lands beyond in the north, and southern Syria and Egypt in the south.

It will be instructive to offer at this point an overview of Ebla's imports and exports. The former included: (1) lapis lazuli, carnelian, tin, carapaces, sea shells, textiles, and wool – from Mari; (2) silver, gold, and tin – from Anatolia; (3) timber, wine, vinegar, and the exotic foodstuffs A.HA and *ki-ba-um*¹⁷ – from the Amuq Plain and Cilicia; (4) the kunga₂ “mules”, sheep, and wool – from Nagar in the Khabur region and other localities in northern Mesopotamia (such as Hamazi); (5) elephant and hippopotamus ivory, elaborate linen textiles, gold, and various semi-precious stones – from Dugurasu¹⁸ and DULu.

11,000 la-ha represents 330,000 l of olive oil. Another tablet lists 2,800 la-ha of olive oil on hand and 2,286 la-ha of expended olive oil (ARET 2 20 obv. iii 1–3).

15 an-še₃-gu₂ 1 li-im 81 la-ha i₃-giš-i₃-giš e₃ Ma-ri₂ ki 2 mu, “a total of 1,081 la-ha jars (= 32,430 l) of olive oil (which was expended for Mari, during two years)” (ARCHI 2016, 12–13, TM.03.G.1000 rev. viii 1).

16 ARET 9 80 records large volumes of scented olive oil, measured in gu₂-bu₃ (size unknown), that was expended for DULu, Nagar, and DU-mana (location unknown), as well as for Mari.

17 The chief supplier of wine (geštin) and vinegar (geštin-a) to Ebla was Kakmium (the Amuq Plain). For A.HA and *ki-ba-um*, see under 2.1. and n. 29.

18 As recently argued by Maria-Giovanna BIGA (2012; 2016), it is absolutely certain that Dugurasu designates either Egypt itself or some intermediate place on the Mediterranean.

Most of these materials were subsequently resold by Ebla to other locales. Thus, silver and gold were exported to Mari, which, almost certainly, resold some of it to northern Babylonia. Tin, silver, and lapis lazuli were traded to DULU and Dugurasu. Although we lack direct confirmation of this, timber undoubtedly was exported to Mari and northern Babylonia. At least some of the elaborate Egyptian linen textiles were traded to Mari.¹⁹ The *kun-ga₂* “mules”, which came from Nagar and northern Mesopotamia more generally, were exported to various locales in northern Syria and Anatolia.

As for Ebla's own products, olive oil was exported to Mari, DULU, and Nagar. The textiles (some of which may have originally been imported from Mari, Nagar, and other sources) were traded to Anatolia and Cilicia, and throughout northern and southern Syria.

Although trade in all of these goods must have been the source of significant income, it appears that, on the whole, Ebla's largest profits came from the exports of silver, gold, and timber. It is the last of these materials – timber – that we are now going to consider in detail.

2. Ebla as a trader of timber

The conclusion that Ebla was actively involved in timber trade is unavoidable, if based on common sense alone.²⁰ On one hand, we know that timber was one of the main items of the Euphratean commerce, which means that an overland component of that phenomenon must have existed as well. On the other hand, there is the issue of Ebla's wealth, which, as I pointed out earlier, is difficult to explain in view of the relative insignificance of her natural resources, and of her being located quite far away from the Euphrates. This difficulty disappears if we connect the two together and assume that Ebla, thanks to her intermediary geographical position between the sources of timber and the various importers of this product situated along the lower course of the Euphrates, at the time of Ebla archives held a virtual monopoly over the timber trade of

northern Syria. As suggested earlier, Ebla's advantageous geographical situation had also enabled her to become a chief trader of silver and gold in that region. Taken together, these facts would explain why Ebla had become such a rich and powerful polity.

The immediate objection this hypothesis will raise is that the deliveries or expenditures of timber are exceedingly rarely mentioned in Ebla's economic texts. But this is not a major obstacle, since timber trade – and the same is true of stone and metal trade – was virtually never the object of narrow administrative focus. Thus, throughout the 3rd millennium BC (and likewise in the later periods) administrative texts practically never record deliveries of timber, stone, and metals. When we find references to these materials in texts, they had usually been already processed and turned into finished objects.

2.1. Timber in Ebla sources

There do survive, however, several economic tablets from Ebla that offer convincing evidence of her active involvement in timber trade. Typically, rather than being actual records of timber that was either imported to or exported from Ebla, these data are of direct nature, being for the most part references to the garments that had been issued as gifts to the individuals (usually merchants) who had made deliveries of timber to Ebla.

Especially important among these sources is a tablet (TM.82.G.266) belonging to a small dossier found in the southern wing of Palace G. The tablet in question appears to be a record of the total income of Ebla, probably during a single year.²¹ One of the entries included there reads: 1 li 7 mi ma-na kug-babbar nig₂-sam₂ ^{gis}taskarin giš-ir-nun, “1,700 minas of silver (is) the ‘price’ of fir and cedar” (ARCHI 1993b, 8-18, pl. 2-3 no. 2 rev. v 4-7). The Sumerian word nig₂-sam₂ means “price”, but as it is used at Ebla, it may also denote “equivalent” and “value”. I assume that, in this particular instance, it is to be understood as “income from the sale (of fir and cedar)”.

As I will argue later on (see under 2.4.), the Sumerian ^{gis}taskarin (Akkadian *taskarinnu*) is to be identified as Cilician fir (*Abies cilicica*). The identity of the other item listed in this passage, giš-ir-nun, is more complicated. The usual term for “cedar” is of course ^{gis}eren (Akkadian *erēnu*). The sign combination giš-ir-nun means literally “tree of fragrant oil/resin”.²² Following an earlier sugges-

nean coast that was involved in trade with Egypt. This is one of the most important and exciting discoveries in the field of Ebla studies in recent years. For an updated discussion of this issue, see BIGA/STEINKELLER forthcoming.

19 Note the expenditure of one large linen *kirnanum* textile (gada ^{nu}2kir-na-num₂ mah) which was intended for Iku(n)-šar, ruler of Mari (ARET 1 11 obv. vi 2-8). The transporting party, named I-ga-iš-ru₁₂, is otherwise known to have delivered textiles to Mari (ARET 15 22 obv. i 8-12). This particular type of linen textile was obtained by Ebla exclusively from Dugurasu and DULU.

20 This obvious fact has received virtually no recognition in Ebla studies. But note the perceptive conclusions by Frances PINNOCK (1985, 91): “In comparison to Mari, however, Ebla was in a more favorable position, as it could, and did, control almost completely, the supplies of timber from the Lebanon and anti-Lebanon mountains, and, at least in part, the supplies of precious metals – and particularly silver – from Anatolia”.

21 The other sources of income identified there are the revenues from: agriculture (obv. i 1 – ii 6, rev. i 1 – ii 4), animal husbandry (obv. iii 1 – iv 3, rev. iii 1 – iv 1), silver and grain loans (rev. iv 5 – v 3), and *ba-rum₂* (rev. iv 2-4). For a possible meaning of *ba-rum₂*, see below. The text ends with a colophon: lu₂ I-bi₂-zi-kir, “(these are the revenues) of Ibbi-zikir” (obv. vi 1), where Ibbi-zikir is the well-known “vizier” of Ebla. Similar cumulative records are MEE 10 15 and 28, which I discuss below.

22 ir-nun is an abbreviation i₃-ir-nun, “fragrant princely oil”, which is well documented in the 3rd millennium text from

tion by ARCHI (1993b, 17), I take this term to be a synonym of ^{giš}eren. An alternative solution would be to see in ^{giš}ir-nun a word for cedar resin/oil.²³ But this solution is hardly satisfying, since the Ebla sources do not otherwise contain any mentions of cedar resin/oil (by using ^{giš}ir-nun or any other term). More fundamentally, one is perplexed by the fact that ^{giš}eren itself never appears in this documentation, the only type of timber mentioned there being fir = ^{giš}taskarin (see the data discussed below).²⁴ In spite of all these reservations, however, the explanation of ^{giš}ir-nun as “cedar” appears to be the most likely solution at this time.

Regardless of how ^{giš}ir-nun is to be understood, I submit that this source offers incontrovertible proof that the exports of timber accounted for a significant portion of Ebla’s income. That timber consisted of fir (certainly) and cedar (possibly).

Interestingly, another entry of the same text records the income from *ba-rum*₂, which amounted to an astronomical sum of 1,400 minas of gold: 1 li 4 mi ma-na kug-sig₁₇ nig₂-sam₂ *ba-rum*₂ (rev. iv 2-4). The exact meaning of *ba-rum*₂ is unknown, though this term also appears, as a plural form *ba-ri₂-u₃-du*, in MEE 10 28. In that text, which is an account covering three years, very large volumes of silver and gold are alternatively designated as either “expended” (*e₃*) or *ba-ri₂-u₃-du*. The amounts of *ba-ri₂-u₃-du* recorded there are: 8,516 minas of silver, 2,153 minas of silver, 122 minas of higher-quality gold, and 1,736 minas of lower-quality gold. The corresponding “expenditures” amounted *in toto* to 10,419 minas of silver and 95 minas 50 shekels of higher-quality gold plus 405 minas 50 shekels of lower-quality gold.²⁵ The fact that, in this text, *ba-ri₂-u₃-du* almost certainly is the opposite of *e₃*, “expenditure”, demonstrates that *ba-rum*₂ / *ba-ri₂-*

u₃-du represented an income of some sort. Very tentatively, it may be considered that the income in question derived from the custom fees that Ebla levied on the long-distance trade passing through her territory.²⁶

To resume our discussion of Ebla’s involvement in timber trade, a number of other sources confirm that she indeed dealt in fir. Of special interest in this connection are the following three texts, which refer to the deliveries of fir made by the men of Armi(um), Kakmium, and Šanugu:

1. 4 garments for *maškim-e-gi₄ Ar-mi-um^{ki} u₃ A₃-ma^{ki} šu mu-taka₄ ^{giš}taskarin*, “the agent of Armi(um), a conveyor of (goods via) Ama, who delivered fir” (ARET 15 51 obv. x 16-22).²⁷
2. 2 garments for *Ib-dur-ma-lik šu mu-taka₄ ^{giš}taskarin Kak-mi-um^{ki}*, “Iptur-malik who delivered fir from Kakmium” (ARET 12 807 rev. ? iii’ 1-4).
3. 3 garments for *Ša-nu-gu^{ki} šu mu-taka₄ ^{giš}taskarin*, “a man of Šanugu, who delivered fir” (ARET 3 337 rev. iv’ 3’-6’).

As far as one can tell, Šanugu was an insignificant place, whose location remains unknown. Armi(um) and Kakmium, on the other hand, were major kingdoms, which counted among Ebla’s most important political and commercial partners. While it is clear that Armi(um) and Kakmium were neighbors, their exact locations remain a matter of dispute. However, the view that seems to dominate these days is that these two polities bordered on the Mediterranean coast, with Armi(um) being situated in Cilicia, and Kakmium on the Amuq Plain (also known as the Plain of Antioch) (see BONECHI 1993; 2016a, 59 n. 193; 2020, 119; CATAGNOTI 2016, 48; WINTERS 2018, 189-275, 341-353; BONECHI/WINTERS 2019; BIGA/STEINKELLER forthcoming). If correct, this hypothesis would place Armi(um) and Kakmium in the immediate proximity of the coastal forests of modern southeastern Turkey and

Babylonia (see, e. g., the passage from the hymn to Šamaš cited in n. 5). In a bilingual lexical source from Ebla, IR.NUN is translated as *ar-gu₂-um* (VE 1042 = MEE 4 314), where the Semitic gloss almost certainly corresponds to the Akkadian *argānu*, a type of conifer and the resin obtained from it (CAD A/2 253-254). The logogram GIŠ.IR.NUN itself is translated, in the same source, either as *i-tum* (meaning obscure) or as *ar-gum₂*. See GIŠ.NUN.IR = *i-tum* (VE 470 = MEE 4 252), GIŠ.NU[N.IR] = *ar-gum₂* (FRONZAROLI 1984, 136 TM.75.G.5653+ obv. xv 16’ f., which is a presumed variant of VE 470).

23 Superficially, such a possibility finds support in the lexical entry GIŠ.NU[N.IR] = *ar-gum₂* (see the preceding note), where *argum* may mean “resin”. However, since the terms for conifers often denote both the tree and its resin (as in the case of ^{giš}eren / *erēnu*, which means both “cedar wood” and “cedar resin/oil”; another example in point is *argānu*), this is by no means certain. At any rate, in this particular example, GIŠ.NU[N.IR] more likely is a mistake for IR.NUN (meaning, therefore, that the entry in question is not VE 470 but VE 1042).

24 However, as demonstrated by the archaeological data (see under 2.4.), cedar was available and widely used at Ebla.

25 A closely related account is MEE 10 15, which, however, lists only the “expenditures” of silver and gold: 8,389 minas of silver, expended over a period of three years, and 96 minas 50 shekels of higher-quality gold plus 405 minas 47 shekels of lower-quality gold, expended over a period of six years.

26 In fact, since *ba-rum*₂ could not have constituted revenues from either agriculture or animal husbandry (as shown by TM.82.G.266), trade appears to be the only possibility here.

27 The phrase *u₃ A₃-ma^{ki}*, “transporter/conveyor of Ama”, is frequent in Ebla documentation (consult EbDA), apparently designating a person transporting commercial goods through the territory of Ama. For our purposes, particularly relevant are the following examples, which concern Armi(um): 3 garments *Zu-ha-ri₂-iš Ar-mi^{ki} u₃ A₃-ma^{ki}* (ARET 15 24 obv. vii 5-9); 3 garments *maškim-e-gi₄ Ar-mi^{ki} u₃ A₃-ma^{ki}* 2 garments *maškim-su₃* (ARET 15 rev. viii 4-10); 2 garments *Ar-mi-um^{ki} u₃ A₃-ma^{ki}* (ARET 15 58 obv. viii 3-60); 1 garment *IGI.NITA Ar-mi-um^{ki} u₃ A₃-ma^{ki}* (ARET 15 51 obv. ix 2-5). In all likelihood, Ama, which was a dependency of Ebla, and possessed a system of fortresses (see esp. ARET 13 9), was located to the northwest of Ebla. See ASTOUR 1988, 141, n. 23, and ARCHI 2008, 96, who suggest that Ama may be identical with *ma-at A-ma-e^{ki}* of the inscription of Idrimi of Alalakh (line 37), and locate it in the region of modern Afrin (Kurd Mountains). This location of Ama would have made it a perfect exchange point between Armi (in Cilicia) and Ebla. For *u₃*, see WINTERS 2019, 112-114.

northern Syria, such as the Amanus range (the modern Nur Mountains) and the Jebel an-Nusayrīyah, which is situated directly to the west of Ebla.

The possibility that Ebla's supplies of fir came from the forests exploited by Armi(um) and Kakmīum finds support in four other Ebla sources, which mention an official called "the warden of the mountains (or mountain) of fir" (ME.SIG kur^{ki} gištaskarin, with variants)²⁸:

1. 5 garments for 2 maškim Mu-du-ri₂ ME.SIG kur^{ki} gištaskarin, "2 agents of Muduri, the warden of the mountains of fir" (ARET 15 9 obv. iv 3-6).
2. 2 garments for Ar-mi-um^{ki} ME.SIG gištaskarin, "a man of Armi(um), the warden of fir" (ARET 15 38 obv. xii 12 – rev. i 2).
3. 2 garments for Ar-mi-um^{ki} ME.SIG gištaskarin (ARET 15 51 obv. x 10-15).
4. [x garments] for ME.SIG giš kur^{ki} gištaskarin, "the warden of the trees of the mountains of fir" (ARET 3 235 obv. v 1'-2').

As suggested by CATAGNOTI (2016, 35; 2019, 30), it is possible that the unnamed "man of Armi(um)" appearing in texts 2 and 3 is the same person as Muduri of text 1. Be that as it may, however, it can be independently demonstrated that the said Muduri was in fact a citizen of either Armi(um) or Kakmīum (WINTERS 2019, 214). This conclusion rests on the fact that Muduri is documented elsewhere as a supplier of the rare exotic products A.HA and *ki-ba-um* (probably foodstuffs), whose suppliers were Armi(um) and Kakmīum.²⁹ Therefore, we may confidently conclude that the "mountains of fir" is an Ebla designation of the forests of Armi(um) and Kakmīum. Incidentally, the "mountains of fir" are also mentioned in another Ebla text (TM.75.G.10041+10249 obv. viii 3-6, cited by CATAGNOTI 2016, 35, which records an expenditure of olive oil for a man traveling to the "mountains of fir" (du-du kur^{ki} gištaskarin).³⁰

28 For ME.SIG, a presumed variant IGI.SIG, see CATAGNOTI 2019. Although the exact meaning of ME.SIG is obscure, this designation seems to denote person's responsibility for various areas of economic activity. In this particular instance, therefore, the ME.SIG of the "mountains of fir" probably was an Armi(um) or Kakmīum official who supervised the forests in question, and who was responsible for the harvesting of their timber as well as for the exportation of that timber to foreign places. This would mean that, at the time of the Ebla archives, these natural resources were centrally managed and remained subject to protection. The existence of such "forest wardens" necessarily brings to mind the legendary Huwawa, who guarded the "Cedar Forest" as narrated in the "Gilgamesh Epic". In that composition, Huwawa is called *mašsar erēnim*, "guard of cedar" (GEORGE 2003, vol. 1, 236, Old Babylonian Schøyen₂ rev. line 60; 264, Old Babylonian Ishchali line 34') or *nāšir qišti erēni*, "guard of the cedar forest" (*ibid.* 566, standard version, line 220, *etc.*).

29 For A.HA and *ki/gi-ba-um*, whose meanings are obscure, see, most recently, BONECHI 2016a, 57-58, n. 182; WINTERS 2019, 217-219, 346, 351-353.

30 Occasionally, Ebla sources also record the prices of fir. See under 2.7.

As for the potential route(s) over which fir was transported from Armi(um) and Kakmīum to Ebla, I discuss this issue in detail under 2.4.

While Armi(um) and Kakmīum appear to have been the usual sources of Ebla's fir, there are indications that this product could be obtained from other places as well. Thus, three tablets record purchases of fir, in exchange for wool, at the market of Ši'am(u).³¹ Since this market is mentioned frequently in Ebla documentation, it must have been an important trade center (BIGA 2002, 281). Unfortunately, the location Ši'amu, which was also a cultic center of the gods Rašap and Nidabal, remains unknown.

It is fair to assume that much of the fir that had reached Ebla in this manner was subsequently used locally (this is confirmed by the archaeological data, see below under 2.3.). We can be equally confident that a considerable portion of these imports (perhaps even a bulk of them) were later resold by Ebla to other places, which were situated at a greater distance than she from the "mountains of fir". One thinks here especially of Mari and the cities of northern Babylonia (such as Sippar and Kiš) and Nagar in the Khabur Valley. Unfortunately, extant data do not offer any confirmation of this. But there survives a record of the shipment of fir from Ebla to a locality even more remote and exotic.³² The record in question is a letter written by the ruler of Ebla named Irkab-Damu to Zizi, the ruler of Hamazi, a state in northeastern Mesopotamia, in terms of its geographical extent roughly identical with later Assyria (STEINKELLER 1998, 79-85). According to this letter, Irkab-Damu sent to Zizi, as a good-will gift, a quantity of fir, expecting to obtain fine "mules" in return.³³ Irkab-Damu's gift is described as 10 pieces (probably logs) of fir and 2 objects made of fir called gam. If gam stands here for "wagon" – rather than for "wheel", which is the usual meaning of gam in Ebla sources – what Irkab-Damu sent to Zizi apparently was 10 logs or trunks of fir transported on 2 fir wagons. Be that as it may, it is clear that fir was the most precious commodity that Ebla could offer to an Assyrian ruler.

2.2. Ebla as a timber emporium in later texts

That Ebla played a prominent role in the international timber trade is confirmed by a number

31 For a discussion of these texts, see under 2.7.

32 ARET 13 3. For the most recent discussions of this document, see BONECHI 2016b; WINTERS 2019, 125-126.

33 The animal in question, called kunga₂, was a hybrid of the domestic ass and the onager (*Equus hemionus onager*). The kunga₂ were mainly imported by Ebla from Nagar in the Khabur region, where they were bred (ARCHI 1998). Importantly, the kunga₂ could be obtained also from Mari (MEE 12 36 rev. xxiii 18-20). This is not surprising, since Mari enjoyed direct access to the Khabur region. It is likely that Mari, apart from Ebla, exported them to northern Babylonia. The kunga₂ were very expensive, with their prices reaching as much as 5 minas of silver per one animal (ARCHI 1998).

of later sources. Thus, Gudea, a ruler of Lagaš in southern Babylonia who reigned around *ca.* 2100 BC, in one of his inscriptions (Statue B) claims to have imported various kinds of trees from Ebla,³⁴ as part of his reconstruction of the temple of Ningirsu in Girsu:

uru Ur-su^{ki} hur-sag Eb-la-ta ^{giš}za-ba-lum ^{giš}u₃-suh₅
gal-gal ^{giš}tu-lu-bu-um ^{giš}kur ad-še₃ mu-ak-ak
From the city Uršu (and) the mountain range of
Ebla (he obtained) juniper, great pines, and the
plane tree?, a mountain wood, (and) he made
them into timber rafts³⁵ (EDZARD 1997, 33 v
53-58).³⁶

It is impossible to say how accurate all this information is, since practically nothing is known about Ebla's political and economic circumstances toward the end of the 3rd millennium BC, in particular, if Ebla was still actively involved in timber trade at that time. Even if it does not reflect historical reality, this datum is highly important, for it demonstrates that Ebla's fame as a timber emporium was still alive in Gudea's day.

This reputation of Ebla survived well into the 2nd millennium BC. A Sumerian composition known as "Nanna's Journey to Nippur", which dates to *ca.* 1800 BC, describes how the forests of Ebla supplied pine trees for the ceremonial boat for Nanna, the god of Ur in southern Babylonia:

^{giš}a-da (var.: ^{giš}[a]d) ma₂-bi kur šim-^{giš}eren-na-ta /
^dDil₂-im-babbar-ra! mu-na-da-an-ri-am₃ / ^{giš}u₃-
suh₅>-bi tir Ib/Ib₂-la-ta / ^dDil₂-im-babbar-ra mu-
na-da-an-ri-a / ^{giš}u₃-suh₅-bi ^{giš}tir ^{giš}eren-na-ta /
^dNanna-^dSuen<-ra> mu-na-da-an-ri-a
Rafts and boats brought down (cedar) from
the "Mountain of Cedar" for Dilim-Babbar
(= Suen); they brought down pine from the
forests of Ebla for Dilim-babbar; they brought
down pine from the forests of cedar for Nan-
na-Suen" ("Nanna's Journey to Nippur" lines
68+68a-72).

Even more telling in this respect is the mention of Ebla in the Old Babylonian version of the "Gilgameš Epic". There, in the famous episode devoted to the expedition of Gilgameš and Enkidu to the "Cedar Forest", the goal of that undertaking is iden-

tified as the "land of Ebla".³⁷ This is completely unexpected, since the "Cedar Forest" was traditionally associated either with the Amanus mountains (3rd and 2nd millennia BC) or Lebanon (1st millennium BC).³⁸

2.3. The trees of Ebla and their botanical identifications

Based on the textual data presented thus far (either coming from the economic tablets from Ebla or later texts), it can be established that five trees species were traded (or were reputed to be traded) by Ebla. Their ancient names are: ^{giš}ir-nun, ^{giš}taskarin (Akkadian *taskarinnu*), ^{giš}u₃-suh₅ (Akkadian *ašūhum*), ^{giš}za-ba-lum (*supālum*), and ^{giš}tu-lu-bu-um (Akkadian *dulbu*). Of those, ^{giš}ir-nun is probably "cedar" (*Cedrus libani*) – but note the reservations voiced under 2.1. ^{giš}u₃-suh₅ assuredly is "Aleppo pine" (*Pinus halepensis*),³⁹ while ^{giš}za-ba-lum likely stands for "Syrian juniper" (*Juniperus drupacea*) or "Greek juniper" (*Juniperus excelsa*).⁴⁰ The identification of ^{giš}tu-lu-bu-um is less certain, though it may conceivably represent "Oriental plane tree" (*Platanus orientalis*).⁴¹

The question of ^{giš}taskarin is more complicated. This tree has traditionally been identified as "boxwood" by Assyriologists (see, *e. g.*, POSTGATE 1992, 184; HEIMPEL 2011, 133; CATAGNOTI 2016; CAD T 280-282). However, as was recently pointed out by WINTERS (2019, 127-129), this identification is impossible, for the simple reason that the inscription of Gudea I discussed earlier talks of the trunks of ^{giš}taskarin that were 12.5 m long (the relevant passage is cited in n. 53). This certainly does not fit boxwood (*Buxus sempervirens*), which is a shrub or a small tree.⁴² Another reason why this identification needs to be rejected, is the fact that

37 *šu-nu it-hu<-ú> a-na ma-ti-'Ib-la'* (with crasis), "they approached the land of Ebla" (GEORGE 2003, vol. 1, 234, Old Babylonian Schoyen₂ line 26).

38 As is the case in the late version of the "Gilgameš Epic", where the goal of the expedition is Mount Lebanon: *'it-hu-ú ana KUR Lab-na-nu'* (GEORGE 2003, vol. 1, 588, tablet IV 4).

39 The Aleppo pine (also known as the Jerusalem pine) is native to the entire coastal region of the Mediterranean, including southern Turkey, northern Syria, Lebanon, and Israel. It is a small to mid-size tree, 15-25 m tall, with a trunk diameter of up to 0.6-1.0 m. Though usually found at low altitudes, it can grow in altitudes up to 1,000-1,700 m. See *Wikipedia* under *Pinus halepensis* (accessed 27.07.2019). For ^{giš}u₃-suh₅ in southern Babylonia, see HEIMPEL 2011, 103-111.

40 The Syrian juniper is the tallest species of juniper, forming a conical tree 10-25 m tall, exceptionally up to 40 m, and with a trunk up to 1-2 m thick. It is native to the eastern Mediterranean region (southern Greece, southern Turkey, western Syria, and Lebanon), growing at 800-1,700 m elevations. See DE VAUMAS 1954, 264-267; *Wikipedia* under *Juniperus drupacea* and *Juniperus excelsa* (accessed 27.07.2019).

41 So CAD D 172b, under *dulbu*.

42 The boxwood "typically matures in a shrubby form to 5-15' tall, but may grow as a tree to as much as 20'-30' tall", see www.missouriherbarium.org/PlantFinder/ (accessed 05.08.2019).

34 According to the same inscription, Gudea also imported cedar and fir (^{giš}taskarin), both of which came from the Amanus. See EDZARD 1997, 33 v 28-36, which I cite in n. 53. For the botanical identifications of all these trees, see under 2.4.

35 For (^{giš})ad, "timber raft", see n. 53.

36 Since Uršu was located at a great distance from Ebla (near or on the Euphrates, north of Karkemiš), it appears that the timber in question came from two separate places, Uršu and the mountain range of Ebla, rather than from a single locality – as the absence of the conjunction u₃ between the two toponyms might suggest. Thus, the grammar of the text is probably faulty. Alternatively (but less likely), its author may have been confused about the geography of northern Syria, erroneously identifying Uršu as a mountain range of Ebla.

entire palaces and temples – including their roof-beams – could be built out of ^{gi8}taskarin.⁴³ Again, the small size of boxwood excludes such a possibility.

A recent study of the carbonized plant remains from Ebla (FIORENTINO/CARACUTA 2013; CARACUTA/FIORENTINO 2013; cf. also PINNOCK 2019, 70, n. 13) shed an important light on this question. Its authors have analysed 2,727 samples of such materials, which were collected and preserved in the course of Ebla excavations. Among the samples stemming from Palace G, which yielded most of the data, the types of trees identified were predominantly cedar (*Cedrus libani*) and Cilician fir (*Abies cilicica*) (representing 224 and 86 samples respectively). While the cedar samples came from large roof-beams and columns, those of fir came from smaller roof-beams. There was also some evidence (6 samples) of Aleppo pine (*Pinus halepensis*), whose precise use could not, however, be determined.

In my opinion, the fact that fir was the second most common tree among these samples assures that ^{gi8}taskarin is to be identified as the Cilician or Taurus fir (*Abies cilicica*), a species of conifer in the Pinaceae family. The Cilician fir's natural habitat is restricted to northern Lebanon, western Syria, and the Anti-Taurus mountains of eastern Turkey, where it grows at 800-2,100 m elevations. Significantly, next to cedar, the Cilician fir is the most common evergreen growing in that entire region.⁴⁴ It is a tall, narrow tree,

reaching the height of 25-35 m. Its girth is up to 2.1 m.⁴⁵

This picture of the modern distribution of Cilician fir closely agrees with the historical data, which show that also in ancient times fir represented, after cedar, the second most important source of timber in the entire coastal zone extending from Lebanon to southeastern Turkey. Among these data, the following are particularly noteworthy:

1. the Šamaš hymn from Kiš lists fir, cedar, and cypress among the merchandise that was transported over the Euphrates to Babylonia (see under 1.1. and n. 5);
2. as I demonstrated earlier, in late Pre-Sargonic times, fir was the main source of timber at Ebla; according to its economic texts, it came from the “mountains of fir”;
3. around 2100 BC, Gudea of Lagaš obtained cedar and fir from the Amanus mountains (EDZARD 1997, 33 v 28-36, cited in n. 53);
4. an inscription of Jahdun-Lim, a ruler of Mari at ca. 1800 BC, talks of “the mountains of cedar and fir, the great mountains” on the Mediterranean coast that no Mari ruler had entered before Jahdun-Lim; according to the same source, it was Jahdun-Lim who first entered “the mountains of cedar and fir, the great mountains and cut down these trees – fir, cedar, cypress, and *elammakum* tree” (FRAYNE 1990, 604-608, Jahdun-Lim 2:36-40, 52-56);
5. some 400 years later, the rulers of Byblos and the state of Amurru (northern Lebanon) sent shipments of fir to Egypt⁴⁶;
6. the Neo-Assyrian king Tiglath-pileser I claimed to have cut fir in Lebanon: E₂ *labbu-ni ú-la-bi-in ina ^{gi8}tas-ka-ri-ni [ša ina ...] ‘x’ KUR-e Lab-na-a-ni ak-ki-su-ú*, “I built a *labbunu* (sanctuary) of fir that I had cut down in [...] the mountains of Lebanon” (KAH 2 67:3-4);
7. his namesake Tiglath-pileser III called the northern Anti-Lebanon a “mountain of fir” (*Am-ma-na-na KUR ^{gi8}TASKARIN*) (TADMOR/YAMADA 2011, 40-44 no. 13:6, 73-74 no. 30:2).

⁴³ Particularly important here are the following two passages, coming from the inscriptions of Tiglath-pileser I: *ú ^{gi8}tas-ka-ri-ni ša išt-tu GIŠ.UR₃.MEŠ šá ^{gi8}e-ri-ni ak-ki-su-ú-ni aš-ši-an-ni [i-na] i-ta-at E₂.GAL ^{gi8}e-ri-ni ša-a-ti E₂.GAL GIŠ.TUKUL.MEŠ a-na mul-ta-‘it [E]N-ti-ia e-pu-uš ... išt-tu uš-še-ša a-di gaba-dib-be-ša i-na ^{gi8}tas-ka-ri-ni ar-šip ú-šak-lil*, “I also brought in the fir that I had felled together with the cedar beams; alongside the palace of cedar, I constructed a ‘palace of weapons’ for my lordly pleasure ...; from its foundations to its cornices I erected it completely out of fir” (WEIDNER 1957/58, 352 lines 72-76); E₂.GAL *‘GIŠ.TUKUL-ti-A-E₂.ŠAR₃.RA MAN KUR Aš-šur šá E₂ ^{gi8}tas-ka-ri-ni*, “palace of Tiglath-pileser, king of Assur, (the brick) of the house (made) of fir” (KAH 1 22:1-2). See also below example (6), which stems from another inscription of Tiglath-pileser I.

⁴⁴ For Lebanon, MOUTERDE 1942/43 lists, in the order of their importance, the following seven evergreens that supply timber suitable for construction: cedar, Cilician fir, Aleppo pine, Calabrian pine (*Pinus brutia*), Italian stone pine (*Pinus pinea*), cypress, and juniper (*Juniperus excelsa*). Referring specifically to Cilician fir, he notes: “Les sylviculteurs actuels s'accordent avec l'antiquité pour louer son bois. Il constitue encore aujourd'hui une belle forêt dans le Gebel Akrüm, et a pu descendre davantage vers le Sud dans l'antiquité”. For the distribution of fir in Lebanon, see DE VAUMAS 1954, vol. 1, 261 fig. 45 (map), 263. Note, especially, the following statement: “Bien qu'il soit confiné actuellement à la pointe du Liban septentrional, le sapin semble s'être comporté de la même façon que le cèdre. Comme lui, il pousse en pleine roche et semble s'accommoder très bien des calcaires. Sa limite inférieure se situe à 1.400-1.500 m., sa limite supérieure présente est de 2.000-2.100 m., altitude qu'il n'a sans doute jamais dû dépasser beaucoup” (DE VAUMAS 1954, vol. 1, 263).

⁴⁵ “American Conifer Society”, www.ub.edu.lb/natureconservation/Pages/cilicianfir.aspx (accessed 23.07.2019); “The Gymnosperm Database”, www.confers.org/pi/Abies_cilicica.php (accessed 23.07.2019); *Wikipedia* under *Abies cilicica* (accessed 23.07.2019).

⁴⁶ MORAN 1992, 205-207 EA 126:4-6 (Rib-Hadda of Byblos), 246-247 EA 160:14-19 (Aziru of Amurru), 247-248 EA 161:54-56 (Aziru of Amurru). According to the letter of Rib-Hadda (EA 126), his supplies of fir came from Ugait and Salhi (a dependency of Ugait?). Characteristically, these letters make no mention of cedar, suggesting that fir was the primary tree harvested in Lebanon at that particular time. See also MORAN 1992, 113 EA 40:14, which mentions a delivery of 1 (or possibly 60) log(s) of fir from Cyprus (Alašiya) to Egypt.



▲Fig. 2. Map of Nur Mountains (www.gateofturkey.com [Nature Tourism, Bird Observation, Asi Basins], accessed 15.07.2019).

Surprisingly, in spite of its prominence among the natural resources of the eastern board of the Mediterranean in ancient times, Cilician fir is hardly ever mentioned in the discussions of the sources of timber in that region, which usually focus exclusively on cedar.⁴⁷

2.4. Routes over which Ebla imported and exported timber

Given Ebla's active role in timber trade, we will be justified in assuming that she also had access to the routes along which timber was transported from its sources to Ebla. From there, apparently, timber was transhipped to the Euphrates, to be then floated down to Mari and the various cities of northern Babylonia.

Beginning with the question of the sources of Ebla's timber, one thinks here, firstly, of the Amanus range (modern Nur Mountains) (Fig. 2). There is every reason to think that it is this mountain range that was known in Ebla as the "mountains of fir", the place from which the merchants of Armi(um)

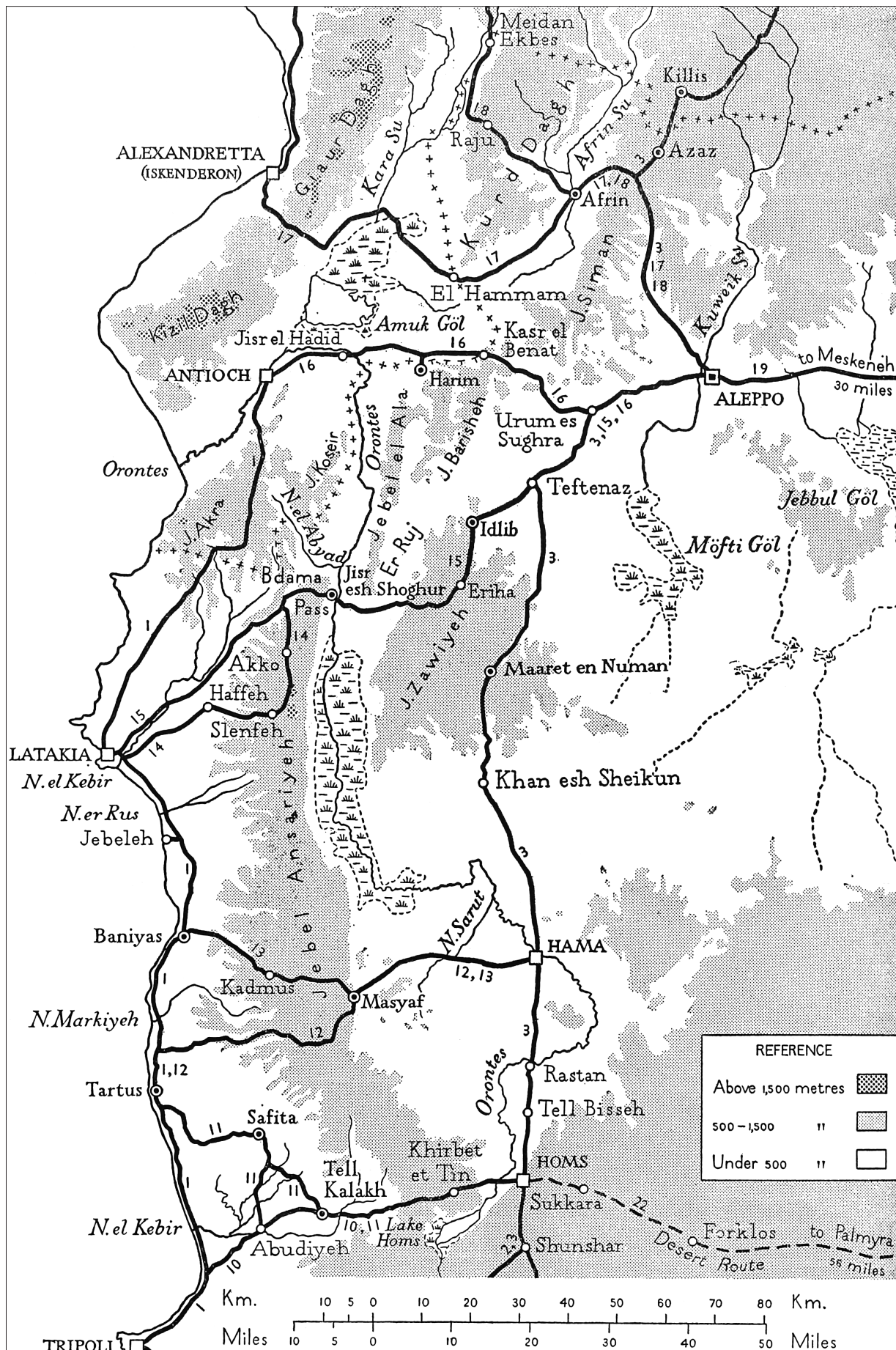
and Kakmium obtained their fir. If Armi(um) and Kakmium indeed represent Cilicia and the Amuq Valley (= the Plain of Antioch) respectively, the route over which timber was transported would mostly likely follow the following course: from the southern reaches of the Amanus, timber would be floated down on the Karasu River, and then towed upstream on the Orontes River, up to the point where the Orontes intersects with the east-west route connecting Idlib with Latakia on the Mediterranean coast (which runs over the Bdama Pass); from there, timber would be transported to Ebla overland, following the said route (which runs via Ariha to Idlib), probably by using animal-drawn wagons.

Another likely candidate here, located even closer to Ebla, is the mountain range of Jebel an-Nusayriyah (also known as the Alawiyyin Mountains) (Fig. 3). Paralleling the coastal plain, An-Nusayriyah begins ca. 20 km north of Homs and Krak des Chevaliers, terminating northeast of Latakia. Its total length is roughly 80 km. An-Nusayriyah has an average width of 32 km. Its average elevation is 1,212 m, the highest peak being Nabi Yunus (1,575 m), east of Latakia. According to a British intelligence handbook for Syria, as late as in 1944, this mountain range still had "good forests of Aleppo pine covering altogether some 25,000 acres" (NAVAL INTELLIGENCE DIVISION OF THE ADMIRALTY 1944, 90). There is no doubt that, in ancient times, An-Nusayriyah also had extensive forests of cedar and Cilician fir.

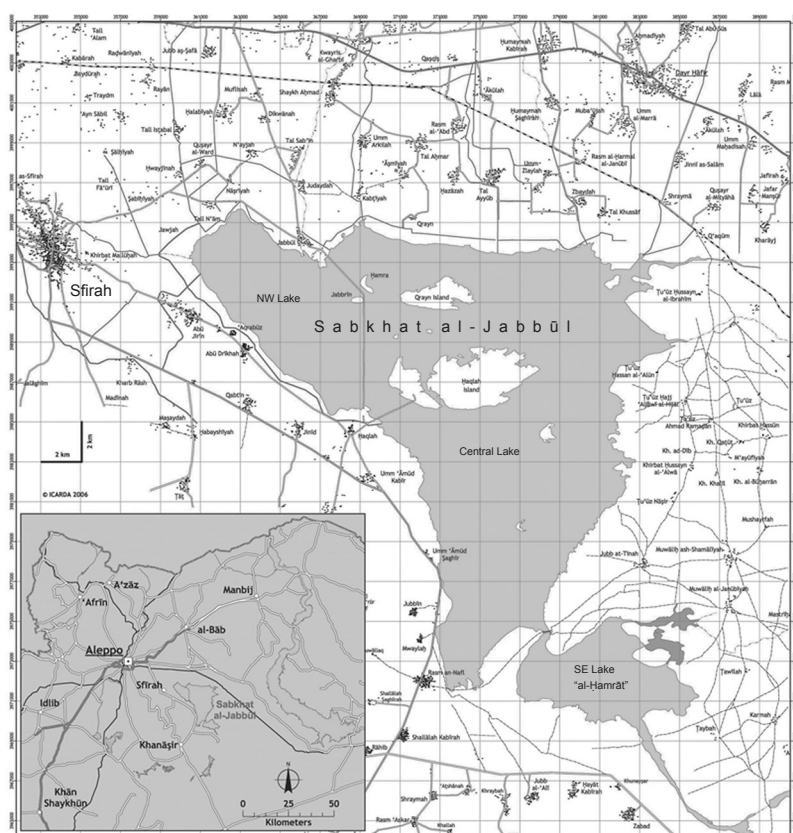
Given the closeness of Jebel an-Nusayriyah to Ebla, its timber would be easy to harvest and transport. On the eastern side of this mountain range, one could roll the logs down the slopes, haul them to the Orontes, and then float them down on the Orontes to the point where it intersects with the Idlib-Latakia route (which crosses over the Bdama Pass). Logs harvested on the western side of the mountains would need to be transported overland, by using the Bdama Pass. One cannot avoid the question: is Jebel an-Nusayriyah the "mountains of Ebla" Gudea talks about in his inscription?

If the timber so acquired were to be subsequently exported to Mari and other, more distant places, the only way to do it would have been through the use of the Euphrates. The question thus arises: How was timber transported from Ebla to the Euphrates Valley? It may be hypothesised that one relied here on the chain of seasonal saline lakes or lagoons (*sabkh*), some of which survive in that region even today. Of those, the closest to Ebla is the Matkh lake, which is situated 15 km east of Ebla (MANTELLINI *et al.* 2013, 164-165, pl. 13 fig. 1, pl. 16 fig. 1-2, pl. 19; PEYRONEL 2014a, 115-116, 148 fig. 3, 150 fig. 7). The Matkh is the remnant of an ancient lake extending 30 km (north-south) and 15 km (east-west), which had been fed by the perennial waters of the Nahr el-Quweiq, flowing southward from Aleppo. On the western edge of the Matkh, there is situated

⁴⁷ Thus, a recent book by Sara A. Rich, entitled *Cedar Forests, Cedar Ships: Allure, Love and Metaphor in the Mediterranean Near East*, while devoting 239 pages to cedar, mentions Cilician fir only once – and in passing (RICH 2017, 42). Similarly, Brigitte WATSON-TREUMANN (2000/01, 77-78) forefronts cedar, cypress, juniper, and boxwood, relegating fir to the trees of secondary importance.



▲ Fig. 3. Map of northern and central Syria (NAVAL INTELLIGENCE DIVISION OF THE ADMIRALTY 1944, 346 fig. 60).



▲ Fig. 4. Map of Sabkhat al-Jabbul (SERRA *et al.* 2006, 129 fig. 2).

Tell Tuqan, an important site occupied during the time of Ebla archives.⁴⁸

Some 30 km to the east of the Matkh, there is Sabkhat al-Jabbul, the largest natural lake in Syria (SERRA *et al.* 2006; *Wikipedia* under *Sabkhat al-Jabbul*, accessed 20.04.2019). Though presently forming a closed saline basin, it is believed that, during the Pleistocene, Sabkhat al-Jabbul was a tributary of the Euphrates. In the past, Al-Jabbul was fed by a seasonal river, called Nahal al-Dahab (Golden River), which, ceased flowing into the lake in the 1960s.⁴⁹ Al-Jabbul consists of a large central lake, and of a smaller, southeastern extension called Al-Hamrat (Fig. 4).

These two bodies of water are separated by Jebel el-Hass, a low basalt range (*ca.* 500 m), which, on its western side, slopes gently toward the Matkh. Immediately to the south of Jebel el-Hass, there is another group of seasonal lakes, smaller than the Matkh and Al-Jabbul, which are called the Kharaitsh (MANTELLINI *et al.* 2013, 165). Conceivably, in ancient times these lakes formed part of the Matkh system. If so, there might have originally existed a continuous line of such lakes, which extended all the way to Jebel el-Hass.

The direct passage from the Matkh depression to Al-Jabbul is possible only through the use of the corridor of Khanaser, which separates Jebel al-Hass from

its southern neighbour called Jebel Shbeyt. It has been suggested that this corridor formed part of an important west-east route, which provided Ebla with access to the Euphrates (PEYRONEL 2014a, 116).⁵⁰

It appears quite likely that, in ancient times, the Matkh, the Kharaitsh, and Sabkhat al-Jabbul contained more water than today. It is even possible that there existed some artificial canals linking some of them. Therefore, even though never forming a single, connected waterway, these bodies of water could, especially during the winter season, effectively be used to transport cargo (either on boats or rafts). Theoretically at least, one may envision that this route began at Tell Tuqan, running then eastward over the Matkh and the Kharaitsh lakes. Having reached their most eastern point, one would then need to transport the cargo overland (by using the Khanaser corridor) to the western bank of Al-Jabbul. There, the cargo would again be loaded on watercraft and transported over Al-Jabbul to the Euphrates.

The existence of such a waterway would provide Ebla with an obvious advantage over other regional powers that participated in timber trade. Those undoubtedly included Aleppo, which too had access to the Amanus and its forests, but, unlike Ebla, lacked a waterway connection with the Euphrates. Therefore, Aleppo would be able to transport its timber to the Euphrates Valley only by using a lengthy overland route, with the resulting increase of its transaction costs. Moreover, by virtue of controlling the Euphrates Valley as far to the north as Abaršal (for the location of Abaršal, see n. 9), Ebla would be in position to tax the shipments of Aleppo's timber intended for Mari and northern Babylonia (and to restrict or even prevent their passage through her territory, if need be). This, obviously, would make Aleppo's involvement in timber trade even less profitable. Similar situations faced Karkemiš and Uršu (both situated along the upper course of the Euphrates), the other likely timber traders. They too would be forced to transport their timber from the Amanus to the Euphrates overland, and, like Aleppo, they would be subject to Ebla's taxation.

As discussed earlier, Ebla owned a port, which was called MA₂.NE^{ki}.⁵¹ Although the location of

⁵⁰ The main archaeological site in that area is Tell Munbatah, which occupies "a strategic position marking the passage towards the east and, through the Jabbul, towards the Euphrates" (MANTELLINI *et al.* 2013, 166).

⁵¹ For MA₂.NE^{ki}, see, most recently, WINTERS 2019; BONECHI forthcoming. As shown by the fact that MA₂.NE^{ki} can be reduplicated (MA₂.NE^{ki}.MA₂.NE^{ki}), this term is not a toponym, but a generic term. Both the use of the sign MA₂, "boat", in the logogram and the contexts of its attestations assure that MA₂.NE^{ki} means "port". Further corroboration of this is provided by the occurrence of MA₂.NE in a bilingual lexical source from Ebla (VE 961 = MEE 4 306), in association with the terms for "sailor" (ma₂-lah₃), "cargo transporter" (u₃), and "barge" (ma₂-gur₃) (VE 962-964). Apart from the MA₂.NE^{ki} of Ebla there existed several other "ports" on the Euphrates, most importantly, that of the city of Emar, which lay immediately to the north of Ebla's territory. For the great importance of the port of Emar

⁴⁸ The ancient name of Tell Tuqan is uncertain. BIGA (2014b, 94 n. 2), suggests an identification with NI-ra-ar^{ki}.

⁴⁹ Today Al-Jabbul is sustained mainly by the drainage water from an irrigation scheme based on the Euphrates.

this facility remains unknown, it is certain, in my view, that it lay on the Euphrates. This is indicated, by its having served as an exchange point between Ebla and Mari (WINTERS 2019, 58-60, 70-83). Moreover, it is impossible to imagine that a great commercial power like Ebla (which is otherwise known to have had direct access to the Euphrates and which held sway over a large stretch of it) would have been able to conduct its business *without* the possession of at least some sort of port facilities on the Euphrates. Given that, as I argued above, there probably existed a system of lakes linking Ebla with the Euphrates, chances are that the MA₂.NE^{ki} of Ebla lay at the point where the most eastern of these bodies of water (the original Al-Jabbul) merged with the Euphrates (whatever the exact location of that place may have been).

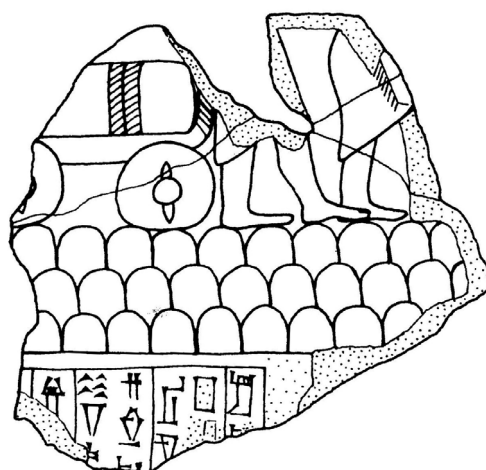
To summarize this part of my discussion, Ebla played a key role in the international timber trade at the time of the Ebla archives. She may have continued to be a major supplier of timber as late as 2100 BC and possibly even later. It appears certain, however, that, by *ca.* 1800 BC, Ebla had ceased to be the political and economic leader of northern Syria, relinquishing that role to Aleppo (= the kingdom of Yamhad). There is every reason to think that, from now on, it was Aleppo that reaped the profits of timber trade, which undoubtedly continued to flourish. Unfortunately, that aspect of Aleppo's history remains undocumented.

2.5. The organization and the mechanics of Ebla's timber trade

Ebla tablets offer practically no information as to how exactly the timber trade was organized. Since, as we have seen earlier, there survive mentions of the merchants of Armi(um) and Kakmium "delivering" fir to Ebla, it would appear that such operations were usually organized and executed by outsiders, with Ebla being merely a terminus of the deliveries. This would mean that at least this component of the trade was conducted exclusively by foreign traders.⁵² As concerns the timber that Ebla

in Old Babylonian times, see CHAMBON 2017, 148-149. As speculated by WINTERS (2019, 58), that port might have actually been identical with the MA₂.NE^{ki} of Ebla. During most of the period covered by the Ebla archives, Emar, while possessing her own king, was a political dependency of Ebla. Conceivably, therefore, Ebla and Emar could have shared the same port facility.

⁵² As noted earlier in n. 8, Mari possessed a large merchant colony in Tunip, which was situated in the Orontes region. BONECHI (2016a, 86-87), and, following him, WINTERS (2019, 357-365), suggest that, given the proximity of Tunip to Jebel an-Nusayriyah and the Amanus, these merchants may have been directly involved in the extraction and collection of timber. In this connection, these authors cite ARET 3 118 rev. iii 6'-9', which records an expenditure of 120 axes (ha-zi) to the "Mari merchants residing in Tunip". While highly suggestive, this datum is inconclusive, however. But even if Mari did conduct independent operations of this kind, the harvested timber would still need to be transported to Mari through Ebla's territory, over the routes I discussed earlier.



▼ Fig. 5. Transportation of timber on a cart, depicted on a stele of Gudea of Lagash (SUTER 2000, 362 fig. ST.20).

subsequently resold to other places, one needs to assume that the operations of this kind were organized and conducted by Ebla herself, mainly through the use of her own merchants but possibly also by consigning timber shipments to foreign traders (such as those of Mari, for example). But we lack any sources illustrating this dimension of the trade, except for the Ebla letter describing a shipment of fir to the land of Hamazi (see under 2.1.). In that particular case, timber was transported by the natives of Ebla.

The written sources at our disposal are equally mute about the mechanics of timber transportation. Here, however, we can rely on a considerable body of comparative historical and ethnographic data (see, *e. g.*, MEIGGS 1982, 332-346), which offer a convincing picture of how it was done. Thus, we can be certain that, during the mountain stage of the operation (the Amanus and Jebel an-Nusayriyah), logs were rolled down the slopes or floated on mountain rivers and streams (the Karasu and the Orontes and their affluents). On level terrain, which accounted for a significant section of the route, logs were probably transported on carts pulled by animals (oxen or mules) or, alternatively, they were carried by human porters. The first mode of transportation is depicted on one of Gudea's steles, which undoubtedly illustrates this ruler's procurement of timber from northern Syria (as described in Statue B, for which see under 2.2.) (Fig. 5). A very similar scene is shown on a Neo-Assyrian relief from the reign of Ashurnasirpal II (Fig. 6).

▼ Fig. 6. Transportation of timber on a cart, depicted on a stele of Ashurnasirpal II (READE 2018, 357 fig. 2 middle).





▲ Fig. 7. *Westerners carrying logs, depicted on a stele of Shalmaneser III (READE 2018, 358 fig. 3 above).*

The proposition that Ebla's timber might have also been carried by porters might appear unlikely at first sight. This mode of transportation is not impossible, as demonstrated by a Neo-Assyrian relief dating to the reign of Shalmaneser III, which shows individual logs being carried by teams of four men each (*cf.* also MEIGGS 1982, 334) (Fig. 7). The log is suspended from a rope in such a way as to distribute the load evenly among the carriers. On another relief of the same date, Assyrian soldiers, in teams of four or two men each, simply carry logs in their hands (Fig. 8).

2.6. Transportation of timber and other cargo over the Euphrates

It is necessary now to consider the means of transportation over the Euphrates, which was the main route over which merchandise was shipped from Ebla to Mari, and from there to various points in Babylonia. As the extant documentation tells us, this merchandise consisted of timber, various types of stone, olive oil, wine, resinous substances, silver, gold, elaborate linen textiles, and probably ivory.

The easiest to transport was timber. Logs were made into timber rafts and then floated downstream. Such a simple raft is depicted on a stele of Gudea, which, like the related Gudea piece I discussed earlier (see under 2.2.; Fig. 5), is an illustration of Gudea's commercial expeditions (Fig. 9). The cartouche over the raft identifies it as a "raft of fir (logs)" (*ad* ^{gis}taskarin).⁵³ A very similar timber

of transporting logs over the waterways. This simple contraption consisted of logs tied together, to which there was attached a pair (or two pairs) of steering oars or paddles. Very often, the timber raft carried also a small hut, in which the rafters found shelter. For a picture of such a raft (Fig. 10), which, in this particular case, shows timber rafts on the Vistula River near the end of the 19th century AD.

Among the attestations of ^{gis}ad, particularly important is Statue B of Gudea, which describes Gudea's acquisition of various types of timber from northern Syria. See the following passage: Ama-a-num₂ hur-sag eren-ta [^{gis}er]en [^{gid}]-'bi 60' kuš₃ [^{gis}]eren [^{gid}]-bi 50 kuš₃ [^{gis}]taskarin gid₂-bi 25 kuš₃ ad-še₃ mu-ak-ak kur-bi im-ta-c₁₁, "from Amanus, the mountain range of cedar, (he obtained) cedars 60 cubits (= 30 m) long, cedars 50 cubits (= 25 m) long, firs 25 cubits (= 12.5 m) long, (and) he made them into rafts; he brought them down from their mountain" (EDZARD 1997, 33 v 28-36, see also v 53-58). The construction *ad* ... ak, "to make rafts", is also documented in the Ur III texts from Umma: x guruš ud y-še₃ ka id₂-GN ad ak, "x male workers, during y days, making rafts at the mouth of canal GN" (UTI 3 1786:1-2, 1964:1-2; *etc.*). In other Ur III sources, timber rafts are routinely listed together with boats, barges, and various boat equipment: 1 ma₂ 60.0.0 gur 2 ^{gis}gi-muš 1 ^{gis}ad šu-du₇-a 1 eš₂ ma₂ gid₂, "1 boat of 60 bushel-capacity, 2 steering oars, 1 fully equipped raft, 1 towing rope" (BPOA 6 1119:1-4); 1 ma₂-gur₈ 70.0.0 gur 2 ^{gis}ad, 1 ma₂-gur₈ 90.0.0 gur 4 ^{gis}ad, 1 ma₂ 80.0.0 gur 1 ^{gis}zi-gan 2 ^{gis}ad (Nisaba 24 26 v 17-18, 31-32, vii 1-3). See further UTI 6 3724:9; ITT 5 10008:7; the examples cited in PSD A/1 6; and "Nanna-Suen's Journey to Nippur" line 68 (cited under 2.2.). As suggested by the syllabic writings ^{gis}a-ta (MARCHESI 1999, 104-108) and ^{gis}a-da ("Nanna-Suen's Journey to Nippur" line 68), the underlying from ^{gis}ad probably was [ada].

As a matter of fact, ^{gis}ad is documented already in Pre-Sargonic times. In particular, see the lexical entry ^{gis}ad = a-tum, a-du (VE 390 = MEE 4 243), where the Semitic word (otherwise unattested in Akkadian) is *atum, a loanword from ad. ^{gis}ad also appears in the "Samaš Hymn" from Kiš, where it alternates with ma₂-gur₈, "barge": MA₂.GUR₈. NA = AD-su₃ (see under 1.1. and n. 5). And finally, note the attestations of ad-gi₄ in ARET 13 15, which I discuss below.

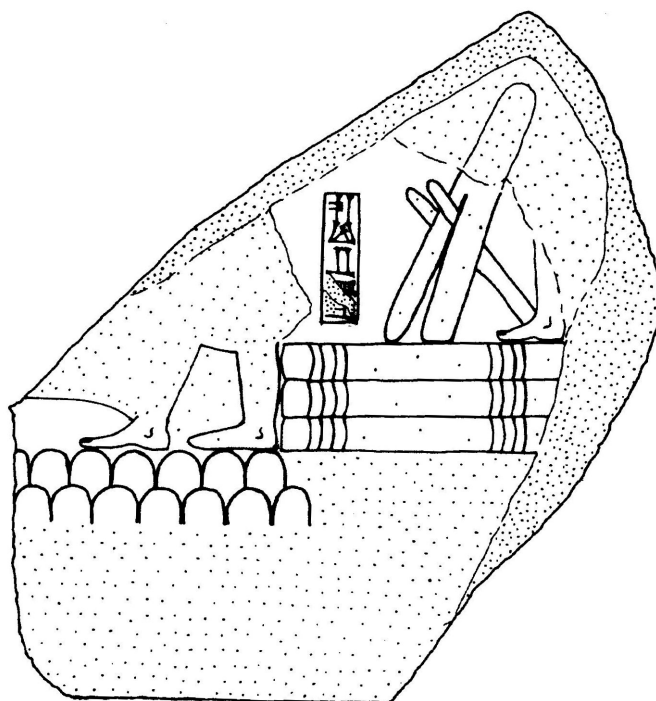
53 The sign TASKARIN is clear in the photograph published by BÖRKER-KLÄHN 1982, no. 58. The Sumerian term ^{gis}ad designates a timber raft. Known to all ancient and pre-modern societies, timber rafting was the most common method



▲ Fig. 8. Assyrian soldiers carrying logs, depicted on a bronze gate of Shalmaneser III, Walters Art Museum, 542335 (Wikimedia Commons, accessed 22.12.2020).

raft is shown on a Neo-Assyrian relief dating to the reign of Sennacherib (Fig. 11).

Other types of cargo must have been transported on boats and rafts. Boats or ships (*ma₂*), some of which are described as “large” (*ma₂ gal*)⁵⁴, are in fact referred to in the Pre-Sargonic texts from Mari (SALLABERGER 2014, 350-351). There also survive two important mentions of “large boats” in Ebla documentation. The first of them comes from ARET 7 11 i 4 – ii 11 (discussed by WINTERS 2019, 116), which records the sale in Mari of 90 *la-ha* containers (= 2,700 l) of Eblaite olive oil, valued at 13 minas of silver, in exchange for 438+[x] textiles and 120 units of fine-quality wool. According to the same source, the hiring of the “large boat” that transported the oil from Ebla to Mari cost 1 mina of silver (*i. e.*, $\frac{1}{13}$ of the value of the cargo). The other example comes from the so-called “Treaty between Ebla and Abaršal” (ARET 13 5 rev. v 9 – vi 3), which names *addir ma₂ gal*, “river-crossing toll on large boats”. The relevant passage reads as follows: “Ebla may conduct long-distance trade in Abaršal; (but) Abaršal may not conduct



▲ Fig. 9. Timber raft depicted on a stele of Gudea of Lagaš (SUTER 2000, 354 fig. ST.11).

⁵⁴ In the 3rd millennium sources from Babylonia, the corresponding term is *ma₂ gal-gal* “large boat/ship”. See, in detail, LAURSEN/STEINKELLER 2017, 104-109.



▲ Fig. 10. Traditional Polish timber rafts, end of the 19th century (“Flisacy w dawnym Toruniu” [www.toruntour.pl, accessed 02.09.2019]).

long-distance in Ebla; (however) Abaršal will collect (from) sailors⁵⁵ the river-crossing toll on (Ebla’s) large boats; [the supervisor of its] market will collect his zi-kam₄ fee”.

A more common form of craft, however, probably were rafts, especially in the upper reaches of the Euphrates, where the navigation is very difficult. Such rafts were likely similar to (or even identical with) the modern *kelek* rafts, which, until very recently, were the usual form of transportation on the upper Euphrates and the Tigris. The *kelek* is “a raft made of brushwood and small pieces of timber, supported by inflated animal skins. The usual number of skins in one raft is 50 to 100, but *keleks* of 250 skins are known, and these can carry loads of 50 tons ... Owing to the swiftness of the current, upstream navigation is not possible, and on arrival at its downstream terminus the *kelek* is broken up, the brushwood sold, and the timber framework and deflated skins carried by pack animals back to the starting point, where they are used again to construct another *kelek*” (FISHER 1978, 390-391). As shown by the following passage from Herodotus’ *Histories*, *keleks* had been a standard means of transportation on the Euphrates and the Tigris in ancient times as well:

But the greatest marvel of all the things in the land after the city itself, to my mind is this which I am about to tell: Their boats, those I mean which go down the river to Babylon, are round and all of leather: for they make ribs for them of willow which they cut in the land of the Armenians who dwell above the Assyrians, and round these they stretch hides which serve as a covering outside by way of hull, not making broad the stern nor gathering in the prow to a point, but making the boats round like a shield: and after that they stow the whole boat with straw and suffer it to be carried down the stream full of cargo; and for the most

part these boats bring down casks of palm-wood filled with wine. The boat is kept straight by two steering-oars and two men standing upright, and the man inside pulls his oar while the man outside pushes. These vessels are made both of very large size and also smaller, the largest of them having a burden of as much as five thousand talents’ weight; and in each one there is a live ass, and in those of larger size several. So when they have arrived at Babylon in their voyage and have disposed of their cargo, they sell by auction the ribs of the boat and all the straw, but they pack the hides upon their asses and drive them off to Armenia: for up the stream of the river it is not possible by any means to sail, owing to the swiftness of the current; and for this reason they make their boats not of timber but of hides. Then when they have come back to the land of the Armenians, driving their asses with them, they make other boats in the same manner (*Histories* I 194; translation after www.classicalwisdom.com, accessed 22.12.2020).

A buoyed raft of precisely this type is depicted on a Neo-Assyrian relief. Consisting of wooden planks mounted on inflated animal skins, and provided with steering oars operated by two rowers, this particular *kelek* is loaded with a cargo of stone blocks (Fig. 12).

As first suggested by POSTGATE (1976, 137), and subsequently elaborated on by FALES (1993, 89-90, n. 37-38), the *kelek* was known in Akkadian as *maškartu*. Importantly, the earliest attestation of *maškartu* appears in a bilingual vocabulary from Ebla, where it is listed as an equivalent of *gur*₈: GUR₈ = *ma-sa-gār-du-um*, *maš-gār-tum* (VE 1023 = MEE 4 312). In this entry, *gur*₈ clearly is an abbreviation of *ma₂-gur₈*, usually meaning “barge”. The same abbreviated writing appears in a Pre-Sargonic tablet, probably from Mari, which mentions a *gur*₈, “raft”, that was navigated (apparently from Mari) to the city of Sippar in northern Babylonia: *gur*₈ Bu₃-bu₃ lu₂ Amar-šub₃ ki-Zimbir^{ki} [ba-de₆?] (DE BOER *et al.* 2012/13, 183, fig. 1-10 text 1 iv 3-7). See also ARET 12 91 obv. i’ 2’-3’, which seems to name a “raft operator”: lu₂ gur₈ [Ha-su]-wa-an^{ki}.

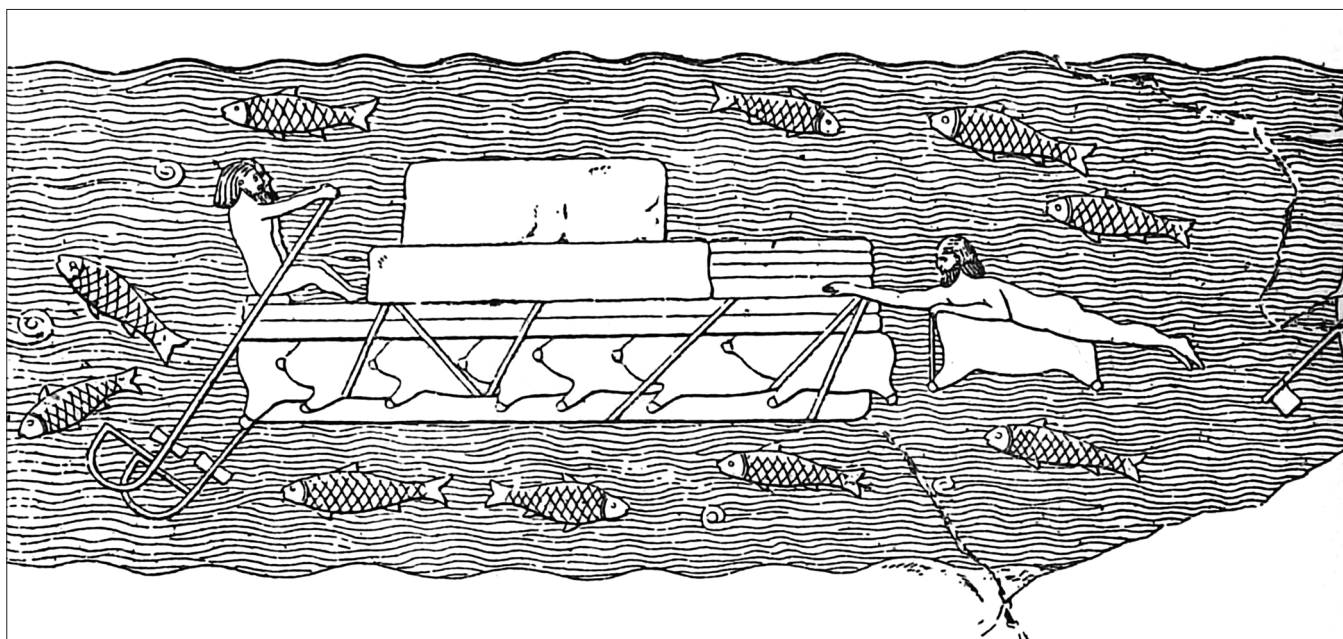
In another Ebla source, the word used for “raft” is *ad-gi₄* (ARET 13 15 obv. iii 17, v 12, 16).⁵⁶ This source, which, because of its script and lexical peculiarities, appears to have been written in Mari, records a number of legal cases in which Ebla merchants had been wronged by the citizens and institutions of Mari. Two of these cases concern the

⁵⁵ The text reads *ma-a-lum*, which, in my view, is to be read *ma-a-lum*, and analyzed as a *malahhum*, “sailor”. Cf. MA₂. LAH₄ = *ma-la-hu-um* (VE 962 = MEE 4 306).

⁵⁶ The usual meaning of *ad-gi₄* is “to advise” and “advise”. However, since neither of these two meanings makes any sense in this particular context (and the same goes for “consigliere” of FROZAROLI 2003, 165, and “Berater” of SALLABERGER 2008, 98), one needs to assume that *ad-gi₄* stands here for ^(gi) *ad*, “raft”, which I discuss in n. 53. It is unclear whether this is an intended variant or an error. At any rate, this is the only attestation of *ad-gi₄* at Ebla, with the tablet itself (as noted earlier) probably stemming from Mari.



▲ Fig. 11. Timber raft depicted on a stele of Sennacherib (READE 2018, 357 fig. 2 above).



▲ Fig. 12. An Assyrian kelek or buoyed raft (MEISSNER 1920/25, 252 fig. 65).

theft of olive oil that had been transported on rafts from Ebla to Mari. As unusually informative about the nature and the mechanics of the Euphratean trade, the passages in question deserve to be cited in full:

The merchant Puzri brought a raft (carrying olive oil) to Mari (from Ebla). And he delivered (to the Mari administration) the olive-oil jars representing the “Euphrates tithe” (zag-10 Buranun_x), and those intended for the ... The olive oil (remaining on the raft) was guarded by one (Mari) man. And he (*i. e.*, the guard) took 2 jars of olive oil, measuring 30 liters of olive oil (each),⁵⁷

(for himself). Puzri reported this to Arrum, but Arrum did not do anything about it (lit.: he kept silent) (ARET 13 15 obv. iii 15 – v 10).

Pilsa’i brought a raft (carrying olive oil from Ebla to Mari). And he deposited the raft (in Mari’s harbor) as a security in lieu of the “Euphrates tithe”. And a thief from Mari brought a barge (ma₂-gur₈) during the night. He stole the olive (from Pilsa’i’s raft), and he poured it (into his own containers). And the thief and his Mari helper(s) seized the man guarding (the raft with) olive oil during the night. And they beat up the

⁵⁷ The term used for “jar” in this text is gu₂-zi, which, apparently, was a local Mari word. At Ebla, jars used to store olive

oil were called la-ha, which had a standard capacity of 30 l (sila₃). See ARCHI 2016, 13; WINTERS 2019, 115. As indicated by the present text, the gu₂-zi had the same capacity.

man guarding the olive oil. This is what Pilsa'i reported to the (Mari?) official in charge of the long-distance trade. And the official in charge of the long-distance trade reported this (to his superiors) (ARET 13 15 v 11 – vii 11).⁵⁸

How did one transport merchandise in the opposite direction on the Euphrates, from Babylonia and Mari to Ebla and farther north? The goods so traded were relatively few: tin, lapis lazuli, carnelian, and textiles.⁵⁹ Characteristically, all of these materials are light, and therefore easy to transport.

Since sailing upstream on the Euphrates is largely impossible⁶⁰, the only way to bring boats upstream would be by towing. Towing was, in fact, extensively used in ancient Babylonia, both on the Euphrates and the Tigris.⁶¹ On the Euphrates, however, this method worked, apparently, only as far north as modern Ramadi (110 km west of Baghdad), where the banks of the Euphrates become too high and steep to permit towing. From that point on, goods had to be carried by donkey caravans on the roads running along or in the vicinity of the Euphrates.

As such, the Euphratean trade appears to have been sustained by a perfect, circular communication system: Once the donkey caravans reached their destination points in the north, the animals would then be put on the boats or rafts traveling to the south (as described by Herodotus). Once the boats reached their southern destinations, the donkeys would be either sold or re-used again for the caravans headed north.

2.7. Market value of Ebla's timber

The final issue deserving a comment is the market value of the timber traded by Ebla. As discussed earlier (see under 2.1.), this business activity may have provided Ebla with an income of as much as 1,700 minas of silver per year. While we lack any mentions of the prices of cedar, there survive several attestations of the prices of fir.⁶² Two of those concern the purchases of fir in exchange for wool, measured by a unit called KIN.⁶³ In both instances, the transaction took place at the market of Ši'am(u) (for which see under 2.1.). However, since the silver equivalent of KIN is unknown, the absolute value of the fir purchased in these transactions cannot

easily be determined. Much more helpful here is another Ebla tablet, which contains the following two entries: 60 ma-na (kug-babbar) nig₂-sam₂ 220 ⁸¹⁸taskarin dug₃, "60 minas (of silver) is the price of 220 logs of 'fine-quality' fir"; 1 ma-na kug-babbar nig₂-sam₂ 20 taskarin, "1 mina of silver is the price of 20 logs of fir" (TM.75.G.2315 obv. ii 2, iii 4).⁶⁴ It is unclear if the timber in question was bought or sold, though the first possibility is more likely. Be that as it may, these entries suggest that, at Ebla, 1 log of "fine-quality" fir cost 16.36 shekels of silver, with 1 log of ordinary, less expensive fir costing 3 shekels. One may surmise that the price differential reflected the logs' relative lengths and thicknesses (cf. the data from the Price Edict of Diocletian cited below).

With these data in hand, we may now revisit the question of the 1,700 minas of silver that constituted Ebla's presumed income from the trade in fir and cedar. If the prices of fir indeed ranged between 3 and 16.36 shekels of silver, this would mean a medium price of *ca.* 10 shekels per 1 log of fir. As for cedar, one would need to assume that it was at least twice as expensive as fir, with an average log of cedar costing 20 shekels. Purely as a theoretical exercise, one could then calculate that, if the volumes of fir and cedar were roughly identical, 1,700 minas (= 102,000 shekels) of silver would translate into 3,350 logs of fir at 10 shekels each (= 33,500 shekels), and 3,350 logs of cedar at 20 shekels each (= 67,000 shekels). The resulting total of 6,700 logs appears to lie within a realistic assessment of what Ebla's yearly exports of timber may have amounted to.⁶⁵

Owing to the fact that the written sources from Babylonia hardly ever record prices of timber, a comparative evaluation of the two prices of fir we just discussed is practically impossible. But there is one piece of evidence that could be of potential relevance for this matter. The datum in question comes from an Old Assyrian tablet from Kaneš in Anatolia, which records, interestingly, a price of fir: 15 GIN₂ KUG.BABBAR *ši-im ta-as-kà-rin-é i-li-bi A-da-da* DUB.SAR, "15 shekels of silver, the price of fir, (added) to the debit of Adada the scribe" (TC 2 59:1-6; cited courtesy of G. Barjamovic). Unfortunately, it is unclear whether one or more logs were involved. But, if the former was the case, the price of 15 shekels per 1 log of fir would be remarkably close to what a log of "fine quality" cost at Ebla.

Records of the prices of timber are also extremely rare in the documentation of ancient Greece and

58 My translation follows essentially the excellent rendering of these passages by SALLABERGER 2008, 98-100 – except for the substitution of "raft" for his "Berater".

59 Incidentally, these are the same goods that were traded, some 400 years later, by the Old Assyrian merchants, by following overland routes from the city of Assur to Anatolia.

60 There is evidence that boats could be sailed, at least to some extent, on the lower reaches of the Euphrates. See STEINKELLER 2013b, 464 n. 26, 476-478.

61 STEINKELLER 2001.

62 2 KIN siki nig₂-sam₂ 3 ⁸¹⁸taskarin ... KI:LAM₇ Si-'a₃-am^{ki} (ARET 15 26 rev. v 9-15); 35 KIN siki nig₂-sam₂ 1 mi-at 10 (= 110) ⁸¹⁸taskarin ... KI:LAM₇ Si-'a₃-am^{ki} (ARET 15 43 rev. x 15 – xi 7). According to these data, one log of fir cost between 0.32 and 0.66 KIN of wool.

63 For this unit, see ZACCAGNINI 1984.

64 A partial transliteration of this tablet was offered by BIGA 2002, 286, who read the numeral in obv. ii 2 as 1 (ma-na). However, as shown by the photographs of this tablet kindly shared with me by M.-G. Biga, the sign is almost certainly is 60 and not 1.

65 The prices used in my calculation do not include the markup that Ebla undoubtedly added to the exported timber. Therefore, the actual numbers of sold logs must have been considerably smaller.

Rome. One of the notable exceptions is the “Price Edict of Diocletian” (for an English translation and discussion, see KROPFF 2016). Promulgated in 301 AD, this edict stipulates maximum prices of more than 1,200 items, which include raw materials, labour, services, transport, slaves, and animals.⁶⁶ One of its sections (XI.1) is devoted to timber, specifically, fir, pine, oak, beech, and cypress. The prices of fir, which are of particular interest to us, range from 250 to 50,000 *denari communis* (dc), depending on the log’s length and perimeter. The largest pieces of fir listed (valued at 50,000 dc each) are 50 cubits long and 4 cubits in perimeter. Interestingly, fir logs of the same length are mentioned in Gudea’s Statue B (see above n. 53).⁶⁷

The prices of fir given in the “Price Edict of Diocletian” provide us with a valuable comparative point of reference for those from Ebla. This is especially so, since it is possible to calculate the absolute silver value of fir in both instances. As we have seen earlier, at Ebla, one log of “fine quality” fir cost 16.37 shekels of silver or approximately 136.3 g (1 shekel = 8.33 g) of silver. In the Edict, on the other hand, the silver value of the most expensive fir log (50 cubits long and priced at 50,000 dc) is 1.5 kg of silver.⁶⁸ If the two logs were similar in terms of their quality, we would need to conclude that fir was at least ten times more expensive in the Roman Empire than at Ebla.⁶⁹ However, given all the uncertainties attached to the Ebla examples (not to mention the great differences between the two situations – historical, geographic, and otherwise, this is but a tentative speculation. To prove this point conclusively, one would need a larger amount and stronger data.

Addendum

In a recent article, Grégory CHAMBON (2020) offers important new data on the involvement of Mari, during Old Babylonian times, in the Euphratean trade. See his extensive discussion of the transit fee (*miksum*) levied on the merchandise passing through Mari over the Euphrates (p. 265-266). Cf. our n. 7. Chambon also writes that the main suppliers of timber to Mari were Tuttul, Yamhad (Aleppo), and Karkemiš, with Emar serving as a place “where the wood shipments were organized” (p. 260).

⁶⁶ The prices are given in the *denarius communis* (dc), which was a new theoretical unit. As part of his fiscal reforms, Diocletian also introduced a new silver coin called *aureus*, which equaled 100 *denari communis* and weighed 3 g (or 1/6 of the Roman pound).

⁶⁷ The same inscription names also fir logs that were 25 cubits long. And so does the Edict, where the logs are additionally described as 64 fingers (*digiti*) in perimeter, and valued at 5,000 dc each.

⁶⁸ For the calculation, see the data cited in n. 66.

⁶⁹ The value of timber was very high also in ancient Greece. See BRESSON 2016, 134-136.

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Abbreviations

Assyriological abbreviations used here are those of Cuneiform Digital Library Initiative (<http://cdli.ucla.edu/>), with the following addition:

EbDA Ebla Digital Archives (<http://ebda.cnr.it>)

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A functional approach to money in the ancient world

by FRANÇOIS R. VELDE

Money, monetary exchange, fiat money, commodity money, monetary history

To think about the presence or absence of money across a wide range of historical contexts, I propose a functional approach based on monetary economics and informed by medieval and early modern history. Money is an object that solves a problem of exchange. Depending on the context, the problem may or may not arise, it may be solved by other methods than the physical transfer of tokens, the characteristics of the tokens may vary. Because they solve a problem, monetary objects have more value than their intrinsic content: how little or how much depends on the manner in which they are supplied. When these objects become the standard to express claims or promises, the unit of account ceases to be innocuous.

Ein funktionaler Ansatz zum Verständnis von Geld in der antiken Welt

Geld, Geldaustausch, Fiat-Geld, Warengeld, Geldgeschichte

Um über das Vorhanden- oder Nichtvorhandensein von Geld in einem breiten Spektrum historischer Kontexte nachzudenken, schlage ich einen funktionalen Ansatz vor, der auf der Geldwirtschaft basiert und von der mittelalterlichen und frühneuzeitlichen Geschichte geprägt ist. Geld ist ein Objekt, das ein Tauschproblem löst. Je nach Kontext kann das Problem auftauchen oder auch nicht. Es kann durch andere Methoden als den physischen Transfer von Wertmarken gelöst werden oder die Eigenschaften der Wertmarken können variieren. Da sie ein Problem lösen, haben monetäre Objekte mehr Wert als ihr intrinsischer Inhalt: wie wenig oder wie viel hängt von der Art und Weise ab, mit der sie bereitgestellt werden. Wenn diese Gegenstände zum Standard werden, um Ansprüche oder Versprechen auszudrücken, hört die Recheneinheit auf, unverfänglich zu sein.

Introduction

The organisers of the conference listed a number of broad and general questions about the nature of money that they wished to see addressed. The intent, I assumed, was not to establish a universal definition of money but to facilitate interactions between specialists of different time periods and different disciplines. The questions are so varied and engaging that only a proper history of money would adequately answer them, and I have only attempted to address a few, from my perspective as an economist and a student of medieval and early modern history. To be clear, my intent is not didactic: I have a certain conception of money that guides me in my research and helps me identify topics of interest, but I do not specify a “right” way to think about money, even if it might sound like that to you. To the extent that you are interested in the economic approach to the subject, you might find this useful.

A functional approach

Money, whatever definition one settles on, has existed for thousands of years in a wide range of societies, at least as wide in range as the papers in this conference. It therefore seems reasonable to ask: what function or purpose does money satisfy in all these different environments? For an economist, this functional approach means asking the question: what difference does the presence or absence of money make in terms of economic outcomes? The basic purpose of economic activity is to produce, exchange, and consume; outcomes (who does what, in what quantities) are called allocations. How does money change allocations?

Money is not obvious

This functional approach is in fact at the heart of monetary theory, because the existence of money is not self-evident in basic economic theory. This may be a surprise for noneconomists, but the problem is well-known, and named the “Hahn problem” after Frank HAHN (1965), who asked: “Why does fiat money have a positive value in exchange against goods and services even though it is not intrinsically useful?”. In his presidential address to the European Economic Association, HELMWIG (1993) still called it “a problem that needs to be solved.” I will briefly present what makes money not obvious in economic theory, and the general ideas behind the approach that has been taken in monetary theory.¹

Economics uses a standard framework to organise thoughts about how individuals make decisions and interact, the Arrow-Debreu model (GEANAKOPOLOS 1987). In its simplest form, actors (individuals or organised groups like households and firms) make decisions on which goods and services to produce, exchange, and consume. Somehow these individual decisions have to be coherent. For example, actors take prices as beyond their control and choose what is best for them at those prices: the prices must be such that demand and supply are in balance (what we call an equilibrium). In the abstract model, without trade frictions or transactions costs, everyone can meet in a central location to buy and sell. All transactions are spot transactions, actors are anonymous, no promises need to be made or enforced. In a setting that extends over time, decisions are made initially and promises are kept.

In this basic setting, anything can serve as a unit of account to express prices, and which good is chosen makes no difference. The need to balance demand and supply determines relative prices: one unit of wheat is worth two units of barley, say. If we wish to express all prices in the same unit, all prices are expressed in, say, units of barley. The choice of unit is both arbitrary and innocuous. (I will come back later to the unit of account function, which is in practice much more important than I let on here.) As for store of value, anything durable and useful is a store of value: a tree, a house, an axe, a lump of metal. If the good chosen as unit of account is durable (say, silver), it will combine the two functions of unit of account and store of value. But this choice will make no difference to the allocations, a convention with no consequences.

Two things follow. For money to have a meaningful role, the basic, frictionless model has to be modified. Indeed, the value of such abstract modeling is not that it represents reality, but that it clarifies what is needed to better represent reality. The other important point is that money is not inherently part of economics: it is a phenomenon that requires explanation. One can conceive of economies without money. Money solves a particular problem of exchange, but conceivably there are other solutions to the problem. Hence, modelling money helps understand which societies will have money and which don't.

A role for money

To model money, a role for it has to be created.

What is that role? For a long time, the famous passage of the 2nd century AD Roman jurist Paulus (*Corpus Juris Civilis*, Digest 18.1.1, *lex origo*) gave the answer: solving the double coincidence of wants problem. If we do not all meet in a central place at the same time as in the basic economic model, but in separate meetings, the following can arise. When A meets B, it happens that A has what

1 An excellent overview of current monetary theory based on the so-called “New Monetarist” paradigm (WILLIAMSON/WRIGHT 2010) is ROCHETEAU/NOSAL (2017). It is highly technical but the general introduction and each chapter's introduction gives a flavour of the questions addressed by this literature. Other paradigms exist: see KAREKEN/WALLACE (1980) for an early survey, BRIDEL (2014) for a review of another approach laying out the general problem in an accessible way.

B wants (wheat) but B does not have what A wants (barley), so that no *quid-pro-quo*, spot transaction can take place. Money is something that A will take from B in exchange for her wheat, even though she does not want it, because she trusts that she will use it in another such meeting to get the barley she wants. Money is now something that makes a difference: with it, trades are made that would not have happened, and society is better off.

The story seems compelling, but it implicitly rules out other solutions. For example, B could promise A to pay back the wheat with barley in the future. Of course, such a promise must be enforceable, because it might not be in B's interest to honour the promise. But enforceable promises are just one solution. A visible record of every transaction would be enough to sustain the following behaviour. We all see that A gave B wheat in exchange for nothing, and we all expect that when A meets C who has barley, C will give the barley to A (and then society, collectively, owes C the value of that barley). If C decides not to give the barley, we will all punish C by refusing to trade with him. An outside observer who is not aware of the implicit threats that sustain this behaviour would be tempted to describe it as "gift-giving," although the outcomes would be the same as in a monetary economy.

Hence all that is needed to replace money is a record of transactions, a social memory (KOCHER-LAKOTA 1998). Another example is a poker game: we could play with tokens or real money, but all we need is someone (trustworthy) with a pad and pencil. The tokens (beans in a poker game, money in real life) are an alternative way of keeping track of each participant's claims on collective resources, what "society owes me" for all the goods I gave to others.

Once you see money as one device among others to overcome a particular problem, you can see that money does not need to exist in all societies – they can well do without, if they have other devices. In particular, a society where all transactions are easily observed and recorded, or where enforcing promises is easy, can dispense with money; a fortiori a command economy in which agents do what they are told and consume what they are given has even less need. This can be true of very "primitive" societies, a small village with limited variety of goods, or sophisticated but centralised societies, as well as in very "advanced" ones as well. The appearance of money is not necessarily the emergence of a solution (and hence progress), but can be the replacement of one solution by another with changing circumstances.

If circumstances are not changing, however, then money (if it truly has a function) changes allocations, for the better. It allows trades to take place that wouldn't otherwise, and in particular it makes anonymous trades possible, since no credit or record-keeping is required. *Quid pro quo* exchanges allow parties to transact without knowing anything about each other or without needing to meet again.

In fact, monetary models will assume anonymity to ensure a role for money (ROCHETEAU/NOSAL 2017, 85; see ALIPRANTIS *et al.* 2005 for a formal exploration of the role of anonymity). If I do not need to know or have a stable relationship with my trading partner, the circle of potential partners will be larger. So money can be seen as in lock-step with the growth of exchange, not in volumes but in connections; and more likely to thrive in societies that find anonymous exchanges useful. This innovation does not come for free: I will return to this point later.

Circularity

One problem with the theory is its circularity. Why does money have value, *i. e.*, why do I agree to give my goods in exchange for a worthless piece of coloured paper? Because I believe that I will be able to exchange it for the goods I want. If people believe that money has value, it does. The corollary is that, if people believe it doesn't, it doesn't. Models of money generally can't prevent this "multiplicity of equilibria": there is always a monetary equilibrium (in which money has value) and a non-monetary equilibrium (in which it doesn't).

Form and value of money

Commodity and fiat

A convenient distinction is between commodity money, which is made of material that has alternate uses, and fiat (in American English) and fiduciary money, which is intrinsically useless.² Gold and silver coins are obvious examples of the first, our current bank notes of the second (our coinage is still made of metal, normally cheap relative to its value in circulation, although sometimes the market price of the metal rises to the point where that ceases to be true). Currency until relatively recently looked like the second but was really like the first: convertible bank notes were made of paper but could be transformed on demand into gold (that's the definition of the gold standard).

The distinction is convenient but not perfect: historically, there are many grey areas. Countries officially on the gold standard might have no actual gold in circulation, and the notes would be convertible only with some difficulty, or only for some

2 I adopt this meaning of fiat money, the usual one for economists (WALLACE 2008), and it does not necessarily involve any role for the State. Historically, however, it meant currency that has value by government fiat or decree. See meaning 2 of "fiat" in the Oxford English Dictionary: "With reference to 'fiat lux' (let there be light) Genesis i. 3 in the Vulgate: A command having for its object the creation, formation, or construction of something" and the derived compound, labelled as US English: "fiat-money: money (such as an inconvertible paper currency) which is made legal tender by a 'fiat' of the government, without having an intrinsic or promissory value equal to its nominal value." The phrase was coined in the 1870s, when the United States was moving from a fiat money regime back to the gold standard.

people, or in very large quantities, or with limited opportunities to use the gold.³ Likewise, commodity money sometimes looks a lot like fiat money, when people don't seem to pay much attention to the intrinsic content of the coins: something that rarely or never happened with gold, but sometimes with silver and often with copper. In fact, many of the interesting (and, for contemporaries, baffling) episodes of medieval and early modern history are instances where commodity money behaves more like fiat money than like the commodity: debasements, currency competition and substitution, the so-called Gresham's Law, *etc.* For example, the possibility of a successful debasement, whereby a coin of lighter weight can replace a heavier coin in trade, and where individuals are willing to exchange heavier coins for lighter ones, is a puzzle if coins only derive value from their weight (see ROLNICK *et al.* 1996 for a statement of the puzzle and VELDE *et al.* 1999 for a resolution using monetary theory).

The theory helps understand why. If theory can explain why a worthless piece of paper can have value, it can just as well explain why a coin can have value above its intrinsic content. Put another way, fiat money is a special case of commodity money, when the commodity has near-zero value (like paper).

The form of money

An important quality of money, flowing from its role as medium of exchange, is fungibility, recognised in Roman law as the notion that one coin is legally the same as another, which was not true of a house or a horse (NUSSBAUM 1950). This relates to several other classic properties of money such as recognisability and divisibility. When buying or selling, I should not have to worry that my coin is accepted for less than an otherwise equivalent coin. Nor should I worry that I might incur a loss if I use two halves instead of one whole, or use fractions instead of whole denominations.

There is plenty of evidence in the contributions to this conference that metallic objects were valued long before coinage, and suggestive evidence that they were used in trade. This is difficult to ascertain without documents, but repeated finds of hoards containing metallic objects of similar form (rings, coils, rods, or even scraps) suggest that the objects remained in that form after exchange rather than be put to use. This, in turn, indicates that they were accepted not to be used or consumed as metal, but to be traded again, even more so when there is little or no obvious alternative use for the metal in that form: this is as close to proof of intent as we can get. Furthermore, Nicola Ialongo and Lorenz Rahmsdorf offer tantalising suggestions of early attempts

at standardising weights, and Julien Zurbach shows the coexistence of standardised and non standardised metallic objects before the appearance of coined money.

Yet when coined money does appear, there is a qualitative change. Rings and coils could conceivably have ornamental use, but coins do not. But the real change is that the first coin systems of 7th century BC Asia Minor feature an astounding degree of standardisation, when contrasted with the hoards of randomly cut-up silver (*hacksilver*) that barely precede them chronologically. The electrum coinage consisted of a wide range of denominations, spanning two orders of magnitude (from 1 to 96), and it was made with amazing precision (VELDE 2019). The purpose must have been to make the objects interchangeable, to make one stater as good as any other and three trites as good as one stater; and the concern for precise manufacturing would remain a constant of coinage to modern times (see GANDAL/SUSSMAN 1997 for the methods of quality control in medieval Europe). Coinage is perhaps the first time that standardisation was so crucial to the usefulness of the object produced. We know that medieval mints produced thousands of identical objects every day under rigorous quality control on both fineness and weight. Judging by surviving specimens, the same was true of the very first coinage as well.

Money and value

Once coined money is used as unit of account, prices are not expressed as quantities of metal, but as numbers of coins. This differs from the abstract model I described earlier, in which a commodity is arbitrarily chosen to denominate prices. Now coins are a new economic object with its own supply and demand distinct from, albeit related to, the supply and demand of the metal with which they are made. Being a distinct economic object, money has a price, distinct from, albeit related to the price of the metal.

For one thing, the stocks of metal that are now immobilised in the form of coin and cannot be used at the same time for something else: other things equal, this reduces the quantity of metal available for alternative uses and hence increases its value. Conversely, the demonetisation of a metal will drive down its value, as happened in the late 19th century when silver ceased to be used except for subsidiary coinage (see VELDE/WEBER 2000 for the theoretical mechanism and for an application to that particular historical episode). In addition, the metal in coined form may well have a higher value than in uncoined form, although it cannot have a lower value as long as one can melt the coin and recover the metal.⁴ Indeed, if costs of

3 During World War I, the United Kingdom and the United States officially remained on the gold standard, but placed various restrictions, such as the inability to export gold. In the Bretton Woods system that prevailed from the 1950s to 1971, the value of currencies was tied to that of the dollar, which was itself tied to gold, but only in specific ways (KENEN 2008).

4 See Alain Bresson's contribution for the fascinating case of the Spartan obeloi, spits made of iron but deliberately ruined by the addition of vinegar. This is a case of money costly to make but useless once coined.

converting metal into coin are incurred, they must be worth incurring. These costs cannot be greater than the value of having metal in the form of coin. One can think of this value, above the value of the metallic content, as the liquidity value of a coin.

This brings us finally to the tale versus weight (*pondero vel numero*) distinction. The point of making coins of a precise weight is that users don't have to weigh them. If they don't, they may cease to pay attention to the content. Counting coins (circulation by tale) is more convenient than weighing them (circulation by weight), but the value of money is less well anchored to the value of metal.

The liquidity value of a coin can be enhanced if the supply of a coin is restricted, typically by a State monopoly on coinage. The monopoly does not matter as much if the State stands ready to provide coin in exchange for metal at a set price, as was common in medieval and early modern times (there is little evidence, one way or the other, on practices in the ancient world). This so-called mint price provides a ceiling on the value of money compared to that of the metal. Without it the monopolist could raise the value of money substantially, but there will be another ceiling of sorts, provided by competition. Individuals might replicate the State's coins or use neighboring State's coins in lieu of their own. The State's powers of enforcement will determine whether it can prevent that from happening. That, at least, is what happened repeatedly in medieval times and hindered scattered attempts at using fiduciary money or at exacting excessive profits from coining for other than short periods of time. The ancient world, however, was apparently more successful in this respect: Clive Stannard's contribution on small bronze coinage in Campania is one of many examples of bronze coinage that circulated at much more than its intrinsic value, with the added twist that the coinage was imported from elsewhere.

Commodity or fiat?

Which form will money take, commodity (where its purchasing power is close to the value of its content) or fiat (where its purchasing power significantly exceeds)? Commodity money has one obvious social cost, namely the commodity that is locked up in the form of money and cannot be used. Put another way, it is the cost of the resources expended to procure the coined metal. A cheap or costless fiat money economises on this cost. To play poker, we can use intrinsically worthless tokens rather than pieces of gold: they only serve to keep count.

The immediate difficulty is counterfeiting, which is already a problem with commodity money when objects appear to be made of precious metal but aren't, and archaeological evidence shows that counterfeiting began even before coined money. This type of counterfeit is profitable because the producer cheats on material costs, by putting in

less metal than there should be. But overvalued tokens can work only if the supply is controlled: if not, and if the production costs are less than the "excess" value of the tokens, they will be produced until the profits are dissipated and the excess disappears. These competitors were typically branded as counterfeiters and subject in later times to the same harsh penalties as producers of the previous type, but always remained a threat and a limit to the issue of fiduciary coinage. It is therefore striking to see that apparently fiat coinage appears at various times in the ancient world, judging by the examples that Alain Bresson provides in his contribution (this volume), to which one might add the mysterious coin-like objects of the Celtic world, molded rather than struck and made of a cheap alloy called *potin*.

One or many?

Once a role for money is created, any money will do. There can be multiple monies or currencies: unless specific functions are designed for each, they can all fulfil the generic role of money. But then a consequence follows, from the "store of value" function: if two currencies coexist and serve the same function, then holders must be indifferent between holding one or the other as store of value, which means they must bear the same rate of return over time, otherwise one would be preferred and drive the other out. If the two currencies have the same rate of return, the exchange rate between the two must be constant; but that exchange rate is indeterminate. If we have blue pieces of paper and red pieces of paper, the exchange rate can be 1 : 1 or 100 : 1, it doesn't matter: but it cannot change over time. It follows from this that, if two currencies coexist but have variable exchange rates, then they must serve different purposes somehow. It also follows that, if the exchange rate is determinate, it is because of some additional factor. For example, the exchange rate between \$1 bills and \$5 bills is indeterminate, except for the fact that the producer of both (the Fed) pegs the exchange rate at 5 : 1 by freely converting five \$1 bills into one \$5 bill and *vice-versa* on demand.

The preceding argument, due to KAREKEN/WALLACE (1981), is strictly valid for fiat monies. In the case of commodity monies, the exchange rate is bounded by the intrinsic contents (or alternative uses) of the commodity content. But as we saw before, there is some leeway for a coin's value to depart from that of its content: this allows for some indeterminacy, a crucial feature in the model of SARGENT/VELDE (2003).

In this view, concurrent monies are simply different economic objects (assets) with different prices, and standard economic reasoning is used to determine their relative values, which will depend not just on weight and matter. In a fiduciary system, all denominations are perfectly interchangeable and fungible, and currency becomes an abstract,

infinitely indivisible object. It actually took a very long time to dematerialise money. Clive STAN-
NARD's contribution (this volume) on the small
change in Campania and the remarkable solutions
that were adopted shows how far back this problem
reaches.

Money, law, State

What is the role of the State in the emergence
of money? Karl Menger (1892) and Georg Frie-
drich Knapp (1924) debated it. Almost two mil-
lenia before, the jurist Paulus gave the first expo-
sition of the double coincidence of wants problem.
Today's monetary theory builds on this insight
and explains under what conditions money has
value, without any reference to the State or to law.
To some degree, that is because a theory of money
based on coercion is not very interesting. But cu-
riously, Paulus continues: therefore "a material was
selected whose public and stable valuation" would
overcome the difficulties of barter. For him, the
emergence of money involves, conceptually if not
historically, explicit choice and public recognition,
whether these come from a political authority or
through a social convention or norm. Conversely,
one can read monetary theory to say that money
can emerge without reference to the State, but
didn't necessarily do so.

The circularity of monetary theory highlighted
above does create one opening for the State. Mon-
ey doesn't need the State to exist (have value) but
the State can help rule out the non-monetary equi-
librium. The classic example is accepting money in
payment of taxes: if the State is always willing to
accept money in payment of taxes at a given rate
or parity, and if the tax liability is unavoidable and
not trivial, then money cannot become absolutely
worthless. In practice, though, we know of many
instances where the State was unwilling or unable
to rule out the non-monetary equilibrium: in 1923
Germany and in 1946 Hungary, the value of money
fell in a matter of months to virtually zero.

These currency failures are but one example of
the limits on the power of States. Money may have
some undetermined but non-zero value because
the State says so, but the ability to set or control
that value is another matter altogether. Medieval
and early modern history is replete with examples
of States attempting to regulate currencies, set ex-
change rates by law, require or forbid the use of
some currency, mostly in vain or with unintended
consequences.

The positive observation remains that, in almost
all of monetary history, State and money are nev-
er far apart. Even in the Assyria of 2nd millennium
BC described by Jan Gerrit Dercksen we see norms
set and restrictions imposed on certain metallic ex-
changes. Early on in Western history, at the latest in
the Roman Empire, the definition and production

of monetary objects becomes a regalian right, and
remains so to this day, though strangely enough,
most legal systems are close to silent on the subject
of money, and there is little scholarship on the sub-
ject (but see FOX/ERNST 2016).

Innocuous unit of account?

Money does appear frequently in the law, and
has for a long time: not in its role as medium of
exchange, but as standard of deferred payment or as
legal tender. The former means that money is a unit
of account for promises, the latter that it is a medi-
um of exchange for promises (more precisely, the
debtor's tender of money discharges a debt whether
or not the creditor accepts).

Here units of account matter: first, because the
norm or requirement that promises be fulfilled in
a certain currency enhances the demand for it; sec-
ond, because the allocative consequences of prom-
ises may now depend on the currency's valuation as
it fluctuates.

Units will matter even more if they are used to
set prices and, for whatever reason, price setting
is constrained: in that case, even spot transactions
will be affected by the value of money. Interestingly,
a popular class of models for the analysis of mon-
etary policy today is one in which money has no
explicit role as medium of exchange, and in which
monetary policy essentially consists of altering the
price of units of account today relative to units of
account tomorrow (also known as the short-term
interest rate). I am alluding to the dynamic sto-
chastic general equilibrium (DSGE) models, com-
monly though not exclusively used in central banks
for forecasting and policy analysis. The title of the
foundational book for this literature (WOODFORD
2011) is the same as that of the classic PATINKIN
(1965), except that the word "money" has been ex-
cised.

The importance of the role of unit of account is,
I think, still under-appreciated in monetary history
and in monetary economics. The dearth of textual
evidence may limit the relevance of that role for the
ancient world; but, from the perspective of medie-
val history, it should still be kept in mind. I remain
struck by the prevalence and multiplicity of medi-
eval units of account, oftentimes coexisting in the
same place, tied initially but later unmoored from
specific coins which suggest that they met a strong
need. The classic example is ghost monies (CIPOL-
LA 1956, ch. 4), units of account that represented
an obsolete exchange rate between two coins. For
example, the gold scudo might be worth 20 silver
soldi, and people became used to equating the two;
but after the gold scudo started appreciating and
became worth more than 20, the "gold scudo" re-
mained as a fictitious unit of account worth 20 sil-
ver soldi, while people would use the phrase "gold
scudo in gold" to refer to the actual gold coin (see
also SARGENT/VELDE 2003, ch. 7).

Conclusion

In my thinking I have often focused, perhaps excessively, on the “birth” of coinage as a single event in 7th century BC Asia Minor, and on its remarkable propagation across the Greco-Roman world. I have learnt from the various contributions in this conference the need to keep a broader and smoother perspective, although there are still many more questions than answers.

A good generally accepted with the intent of exchanging it again remains the definition of a medium of exchange, although intent is difficult to gauge for archaeologists and historians of Antiquity. We naturally try to infer as much as we can from the objects themselves, but we also need to bring to bear what we know about the relevant societies and ask: Would a medium of exchange enable a better allocation of resources? What monetary object would play that role and in which transactions? Did money appear because an alternative mechanism to enable transactions disappeared, or because new opportunities arose that required a new solution? And even if the birth of coinage is only a point in a long evolution that embraces many different societies, varying in their degrees of urbanisation and centralisation, what was different after compared to before?

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Weights, measures, monies

Venetian trade in Mamluk Alexandria within an imperial framework

by GEORG CHRIST

Money, dinar, dirham, lira, Alexandria, Mamluks, customs

Unity in diversity, the simultaneous divergence of languages, norms, customs, weights, measures and monies and convergence of overarching shared base units, enabled and structured transcultural long-distance trade quite effectively and for centuries. This chapter explores the mechanics of Venetian pepper trade in Alexandria in the early 15th century as a case study not so much to support as to animate this hypothesis. It will first give a short overview of the framing of Venetian trade in Alexandria at that time before moving on to questions of metrology, risk management and the character of the Venetian community in Alexandria between metropolitan Venetian or Cairene control and communal autonomy. Differences in languages, norms and practices (including, but less importantly, in metrology) might have fostered the rise of a dominant class of mediators without, however, hindering market integration significantly. For the chapter argues that cultural and metrological difference at the surface coexisted with strong convergence of shared standards of law, practice and metrology rooted in a shared, imperial Euro-Mediterranean past. An extensive appendix sketches out the metrological landscape of Alexandria's trade in the early 15th century.

Gewichte, Maßeinheiten, Geld:

Der venezianische Handel im mamlukischen Alexandria in einem imperialen Rahmen

Geld, Dinar, Dirham, Lira, Alexandria, Mamluken, Zoll

Sprachliche, normative und metrologische Einheit in Verschiedenartigkeit, d. h. die gleichzeitige Divergenz lokaler Bräuche, Regeln, Sprachen, Maße, Münzen und Gewichte sowie die Konvergenz übergeordneter, gemeinsamer Grundkategorien gestaltete und ermöglichte transkulturellen Fernhandel, tat dies recht effizient und über einen langen Zeitraum. Dieser Beitrag befasst sich mit den Praktiken des venezianischen Pfefferhandels am Anfang des fünfzehnten Jahrhunderts als Fallstudie, welche obige Hypothese weniger untermauern als illustrieren soll. Nach einem kurzen Abriss der Rahmenbedingungen des venezianischen Pfefferhandels werden wir auf metrologische Fragen, Probleme des Risikomanagements und den Charakter der venezianischen Gemeinschaft in Alexandria zwischen metropolitaner Kontrolle (durch Venedig oder Kairo) und kommunaler Autonomie eingehen. Praktische und linguistische Unterschiede (eher als metrologische Differenz) mögen den Aufstieg einer Klasse von marktdominierenden Mittlern begünstigt haben. Doch scheint diese einer relativ effizienten Marktintegration nicht im Wege gestanden zu haben. Kulturelle und metrologische Unterschiede an der Oberfläche koexistierten eben mit übergeordneten (oder unterliegenden) gemeinsamen juristischen Prinzipien, ähnlichen Geschäftspraktiken, Grundmaßen, -münzen und -gewichten, die in einer gemeinsamen, imperialen euromediterranen Vergangenheit gründeten. Beigefügt ist ein Anhang zu Maßen, Münzen und Gewichten, die für den venezianischen Handel in Alexandria relevant gewesen sein können.

Introduction

Unity in diversity, the simultaneous divergence of languages, norms, customs and convergence of overarching shared base values and norms, enabled transcultural long-distance trade quite effectively and for centuries. One of the economic tenets of modernity, however, is 'one law, one weight, one measure' (as heralded at the dawn of the French revolution). It is thus commonly assumed that legal and metrological divergence allegedly supremely reigning in the past increased transaction costs, prevented market integration, and thus produced welfare losses. It thus was (and still is) undisputed state policy to suppress metrological diversity in the name of economic growth (VELKAR 2020).

This chapter will approach the question of unity in diversity in the institutional design of long-distance trade through the micro-mechanics of Venetian pepper trade in Alexandria. It is grounded in a documentation from one specific Venetian merchant and consul, Biagio Dolfin d. 1420 (CHRIST 2012a). The surviving parts of Dolfin's private archive contain several hundred pieces of correspondence, accounts, receipts, legal documents, tax bills, *etc.*, which are combined with notarial, judicial and normative material (incl. *tariffe*). This Venetian case study is of an unusually high definition, which may make it useful to develop hypotheses of how to fill in the voids of case studies for which documentation is more fragmentary. The chapter focuses on pepper from its contracting by Venetians to its loading on a Venetian galley in 1419 thereby reviewing the various stages of the purchasing process and the respective actors, institutions, and procedures with a special focus on weights, measures, and currencies.

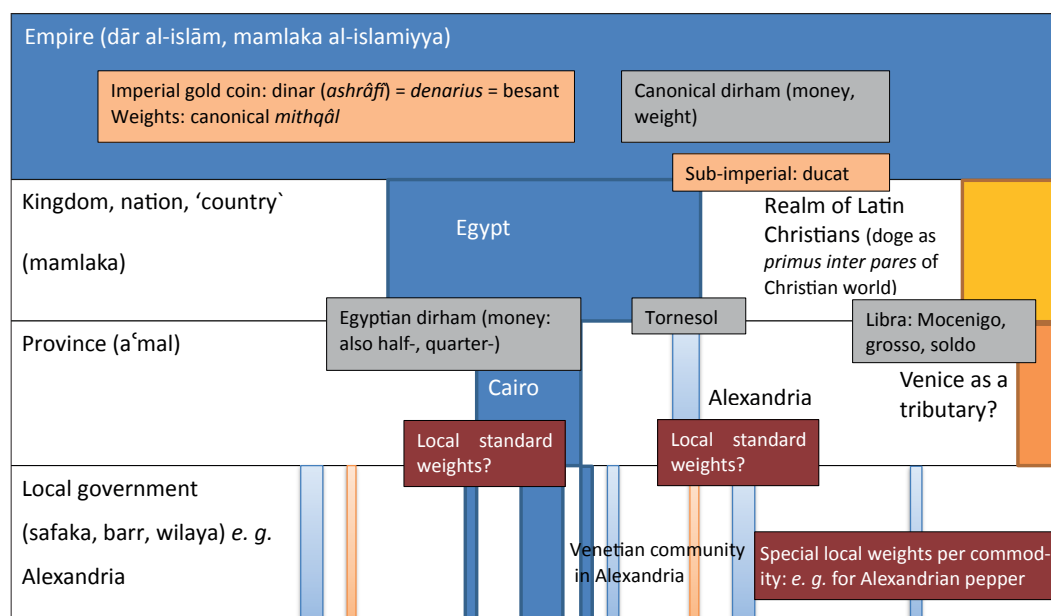
Venetian trade in Alexandria has been widely studied (*e. g.* the magisterial HEYD 1885/86 and ASHTOR, *e. g.* 1983). Yet these studies do not con-

sider in depth the influences of the metrological landscape on the institutional development of the Venetian community in Alexandria and the framing of international trade more generally. Historical metrology, to be sure, has been covered variously but rather as an auxiliary tool to research or some sort of after-thought to it, an appendix (for a rare holistic approach see HOCQUET 1999).

I argue that the intricacies of the metrological landscape did not pose a major obstacle to trade and did not significantly increase transaction costs. Compared to other factors metrological difference seems to have played a negligible part in the emergence of merchant-intermediaries, in this case a coalition of wealthy Venetian merchants and non-patrician long-term residents, specialising in facilitating the modalities of pepper trade in Alexandria. This coalition partially monopolised transactional control in Alexandria and thus gained some economic power. Yet it is questionable to which extent this situation *per se* significantly increased transaction costs. Rather, I would argue that competition between different markets and between merchants within the coalition hedged against the brokers/mediators charging exaggerated monopoly rents.

I suggest comprehending Venetian trade in Alexandria against the backdrop of a model of interwoven trade (but also political and cultural systems) merging in Alexandria both horizontally and vertically. These systems interlocked horizontally through continuous commercial interaction and vertically through a shared economic, institutional and legal history. As part of this shared history the Venetian and Egyptian hierarchised metrological systems used in Alexandria bore strong common features in terms of their functions, hierarchical arrangement and base values (as pointed out by HOCQUET 1999, see also tab. 2). I therefore distinguish between interactions on different levels

► Fig. 1. Metrological unity in diversity against the backdrop of a layered political system from the Mamluk perspective: Shades of blue are Islamic-Mamluk layers of statehood, shades of orange Latin Christianity, Venice and the Venetian community in Alexandria within this system. The light orange (gold), grey (silver) and dark-red (copper-heavy alloy) plot the respective monetary and metrological units onto this system.



(see Fig. 1): macro (empire: Islamic, Mamluk), national-regional (kingdom: as in Egypt, Venice, Aegean), regional (province: Alexandria) and local (communities in Alexandria).

The political system (see Fig. 1) provided the substructure for the integration of trade routes in Alexandria within a logic of unity in diversity. As a loosely affiliated rogue emporium that paid allegiance to all of them, the maritime republic/merchant city Venice integrated into several imperial systems of the time, the Holy Roman Empire, Papal ecumenical Latin Christianity and the Islamic-Mamluk Empire. Venice, from the Mamluk perspective, was some sort of informal leader of Latin Christianity and thus had a status akin to a province with a royal touch (mirrored in Venetian aspiration, COZZI 1989, *cf.* orange boxes in Fig. 1). This ambiguous but useful political set-up enabled the Mamluk sultans in Egypt (ruling from the mid-13th to the early 16th centuries) to grant Venetian merchants a privileged status of a protected non-Islamic community with the Venetian consul being formally integrated into the Mamluk political taxonomy (CHRIST 2014a).

Metrology mirrored this situation of unity in diversity: A common metrological koiné on the imperial level was rooted in a shared Roman-Byzantine imperial past. This koiné included the hundredweight, the drachma/pound, the denarius or the karat. Yet despite all imperial efforts (*e. g.* by Charlemagne, HOCQUET 1999, 245) these units started to diverge quickly and the very same term assumed different values not only from place to place but also within the same place for different purposes or goods (for a sense of this variety, see MARTINI 1914; VELKAR 2020, 82-83 or the app.). There remained, however, common traits in the diversity. Despite all differences in actual weights and measures employed on the ground, there was a convergence towards a shared taxonomy with similar names and base values. There were some clear lines in the chaos, which might explain, how the above-mentioned intermediaries and, to an extent, all merchants coped with this diversity without producing significant transaction costs. The purpose of this chapter can merely be to raise the possibility; only a comprehensive review of medieval metrological (and other) literature could more robustly test this hypothesis. Such a study should also investigate to which extent merchants were aware of these common traits. Did they perceive familiarity (*cf.* TRIVELLATO 2009) in the other's weights and measures? Did they explain commonalities historically or did they see them as anthropological constants?

First, I will provide some background on Venetian trade in Alexandria and its infrastructure before focusing on the particular challenge of metrology, risk management and the influence of these factors on the institutional set-up of the Venetian community in Alexandria.

Venetian pepper trade in Alexandria

Venice's trade links to Egypt date back to the early Middle Ages as illustrated by the legend of the translation of St. Mark's relics from Alexandria to Venice in 828. A more or less permanent Venetian presence in Alexandria can be documented from the late 13th century (Tab. 1) and had become substantial by the late 14th century.

After the fragmentation of the Mongol Empire in the 14th century, the southern maritime route from India via Aden, the Red Sea and Egypt/Syria to the Mediterranean became the main link of the pepper trade between India's Malabar Coast and the Islamic world and Europe. Alexandria as the biggest harbour of Egypt was one of the main nodes in this trade. Before the vertical integration of the pepper trade from the 16th century onwards (STEENSGAARD 1973), the route was split-up into overlapping spheres controlled by different mercantile entities (see Fig. 2). In Alexandria the spheres of the Mamluk-Egyptian (sultanal) state and private traders intersected with that of Venetian (and other European, North African *etc.*) merchants (CHRIST 2014b, 20).

Venetian merchants in this period after the so-called Commercial Revolution have been characterised as sedentary merchants or masters/principals operating from a centre, *i. e.* Venice, through agents doing their business abroad, *i. e.* in Alexandria. High levels of numeracy and literacy enabled this division of labour. Venetians engaged in extensive business correspondence, stabilised cooperation and contracts by notarial deeds, and recorded business in some sort of venture accounting (LANE 1945; MELIS 1950; ASHTOR 1983, 367-416).

The separation between masters and agents, however, does not hold true for the Venetian case. The merchants we encounter in Alexandria are usually both: agents for partners in Venice but also masters in their own right. The organisational form of this trade was usually the joint venture, typically between family members both agnatic and cognatic (MORCHE 2013/20). Such ventures could, however, also be formed between a Venetian patrician and, say, a Jewish merchant from Lecce (CHRIST 2018). They usually appear under the

▼ Tab. 1. Chronology of Venetian consular presence in Alexandria.

1172	First mention of a permanent Venetian consulate and presence (fondaco) in Alexandria
1284	First oath of office (list of duties) for the Venetian consul
1291	Fall of Acre – end of crusader states in Levant
Since late 13 th century	Decline of Pax Mongolica, increased importance of Red Sea route
1308-1344	Papal ban officially interrupting Venetian direct trade with Alexandria
1365	Sack of Alexandria, resumption of trade 1370
1498	Vasco da Gama reaching India
1517	Ottoman conquest of Egypt
1552	Venetian consulate moves from Alexandria to Cairo

► Fig. 2. Imbrication of networks: red = Venetian, green = Mamluk, yellow = Meccan/Kârimi (CHRIST 2014b, 51).



un-specific term of *societas* or (Italian) *compagnia*. These ventures were usually organised as limited liability partnerships, *i. e. colleganze/commende*, whereby a (more or less) sedentary merchant in the metropolis was the *socius stans* entering into partnership with a ‘travelling’ merchant *tractator* (PRYOR 1977). Alternatively, or, rather, in addition, merchants also employed the services of commissioned agents although, especially in the case of inter-family commissions, this interaction rather took the form of a mutual exchange of favours/services. Indeed, an open-horizon exchange of favours, institutionalised friendship, seems to have been the ideal driver also of formalised *commenda* arrangements (CHRIST 2018).

Different types of ships operating under a differentiated set of governmental regulations brought the spices from Alexandria to Venice. The tightly regulated Venetian state merchant galleys (see Fig. 3) enjoyed a privilege on transport of precious commodities including pepper. This, however, did not prevent merchants from transporting pepper illegally or semi-legally by other ships. The state pepper galleys nevertheless were important enough to

cluster pepper-trading activities when they called on Alexandria in autumn for the so-called *muda*, some sort of annual spice fair. Similar to other fairs, it was a platform for the clearing of pepper trade deals that had been contracted ahead of the fair (CHRIST 2012a).

One cannot neatly separate pepper from other trading goods of different ranges of circulation (Tab. 2).

Although the clearing of pepper purchases was primarily effected in specie, *i. e.* ducats, the other listed trading goods formed a significant part of the ‘balance of payment’.¹

Venetian patrician merchants dominated the galley-borne pepper trade although non-patrician merchant-sailors/oarsmen took part in it as well. Merchants usually received first some formal training in abacus schools where they learnt reading and writing, the rudiments of mathematics, Latin and probably some mnemonics. The mathematical

1 The concept of a balance of payment requires clearly defined closed (national) economies, which would be an anachronism for this period. The intention here is merely to indicate that pepper cannot be seen in isolation.



◀ Fig. 3. Conrad v. Grünenberg: *Beschreibung der Reise von Konstanz nach Jerusalem*, ff. 05v-06r. Lake of Constance area, around 1487 (Badische Landesbibliothek Karlsruhe, Cod. St. Peter, pap. 32).

Levels of circulation	Eastern Mediter- ranean	Mamluk Empire, Egypt	Red Sea	Indian Ocean
Macro: (sub-)global/transregional	Pepper, bullion, cloth, slaves			
Meso: regional and interregional	Oil, nuts, honey, wine, wood, beans, grain	Khiswa		
Micro: local, individual	Credit, services, retail trade, information			

◀ Tab. 2. Trade goods grouped by level of analysis (CHRIST 2014b).

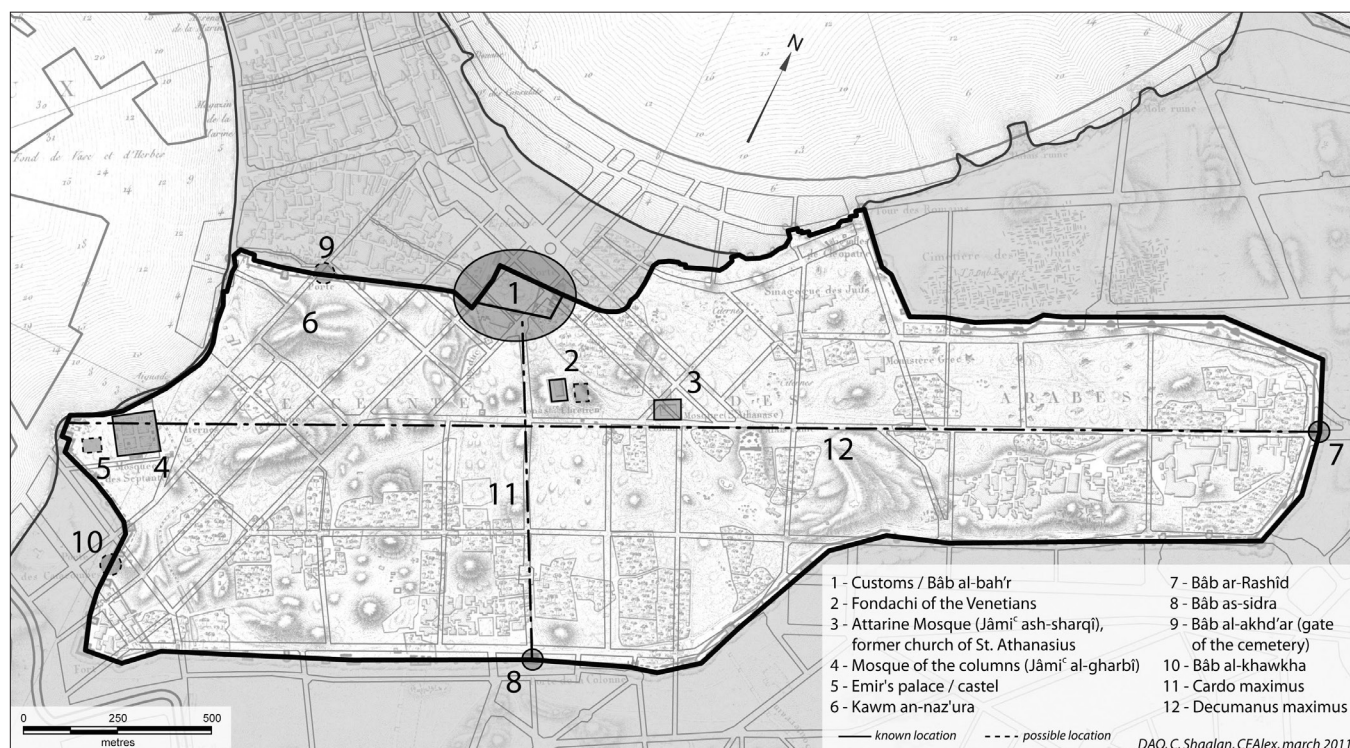
curriculum also included financial and business maths such as conversions, interest and the ‘rule of three’ (HØYRUP 2014, 124). Merchants then trained practically, *e. g.* accounting, as apprentices with an established merchant. This educational journey could be rounded-off by a turn as a *balestriere della poppa i. e.* cross-bow men with officer (cadet) status on a Venetian merchant galley. This gave these patrician trainees access to the captain’s table (LANE 1944, 17-18; STÖCKLY 1995) so that they could network with the patrician officers and merchants on board and learn by emulation or ‘osmosis’ (LEWIS/CHURCHILL 2012, 31).

The setting: Trading infrastructure and processes in Alexandria

The trading geography of Alexandria reflected the diversity in practices and the required translation processes. Ships entered the (eastern) port of Alexandria and bigger ships moored off the shallow coastline (see Fig. 4). After preliminary customs’ clearance on board the ships, merchandise was unloaded (through lighters in the case of

bigger ships) and brought into the city of Alexandria through the customs administration (no. 1 on Fig. 4). The architecture of this structure (also called ‘between two gates’, *i. e.* the gates to the harbour and to the city respectively) set it up as a transitional (third?) space between harbour and city. Here customs were cleared and the sifting and weighing of trading goods, *e. g.* pepper, took place. The customs also acted as a storage facility with some sort of bonded storage (CHRIST 2012a).

Once goods, *e. g.* gold coins (ducats – packed in sealed bags (*groppi*) for quality control (*cf.* STAHL 2000, 231)), copper, cloth or wine, had passed through the customs, they could be brought inside the city. The two main poles of commercial life were the markets and the different *fondacos*, *i. e.* caravanserais (see Fig. 5), allocated to various trading nations by the Egyptian authorities. The Venetians, as probably the biggest trading nation, had two *fondacos* in Alexandria (see no. 2 on Fig. 4). These mercantile complexes provided storage facilities as well as living and working spaces for the foreign merchants. It was also the residence of the Venetian consul and his notary (CHRIST 2014a). The consul covered the Venetian community’s



▲ Fig. 4. Medieval Alexandria, superimposition of modern map with map from the *Description d'Égypte* with partial reconstruction of medieval features (C. Shaalan, CEAlex, localisation errors are the responsibility of the author).



▲ Fig. 5. Fondaco in Cairo, 16th century.

expenses by levying taxes on imported goods (see also below). The notary would not only officiate for Venetians but also serve the entire Alexandrian mercantile community (cf. APELLÁNIZ 2009b; CHRIST 2014a). In addition to the Venetian merchants and their allies providing informal mediating and brokering services, another important category of mediators were the different dragomans and translators, some of them serving the Venetian community in an official capacity (CHRIST 2012a).

Pepper trade in Alexandria was a wholesale business organised on three levels. The Venetian community as a whole was responsible for clearing the so-called sultan's pepper, *i. e.* to buy pepper that the Mamluk sultan, *i. e.* his treasury, had acquired as customs' dues in kind on pepper imported via the Red Sea. The respective negotiations involved the sultan's merchants, the customs inspector, and the governor (emir) of Alexandria. They took place in the *fondaco* and the customs complex (see Fig. 4). This pepper, in theory, had to be acquired at a price above market level. This price, however, was a subject of debate and assessment and left ample room for the consul at the helm of the Venetian community to negotiate an advantageous price with his local Mamluk interlocutors. A small group of particularly wealthy Venetian merchants and their intermediaries effected the actual buying of this pepper and, probably, the subsequent purchases from Egyptian private merchants. They seem to have acted also on behalf of consortia of smaller

merchants for whom they acquired smaller lots of pepper (CHRIST 2012a, 238-239). Once the sultan's pepper was cleared, pepper trade on the open market could commence involving many Egyptian and European merchants (CHRIST 2012a, chap. 13). Pepper once acquired had to be processed through Mamluk customs before it could be packaged and loaded onto the ships.

From these few remarks it becomes clear that there was some sort of autonomous Venetian community in Alexandria led by the consul. The community is somewhat difficult to pinpoint as its numbers exhibited considerable seasonal variations. There was the powerful core group of the long-term resident coalition of Venetian patricians and their lower-rank mediators (*cf.* APELLÁNIZ 2009b; CHRIST 2012b). With the arrival of the galleys, the community swell with a great number of Venetian merchants flocking to Alexandria for the pepper fair. Another peak marked the arrival of the cotton cogs in spring. It is thus difficult to determine membership clearly. It also seems that Venetians in Alexandria were much more welcoming to foreigners than they were in Venice: Cretans, including Jews, could enjoy Venetian status in Alexandria as could non-Venetian Italians.

This was a diasporic community and metropolitan Venetian attempts to control it were only moderately successful. Primarily, this community was part of the socio-political fabric of the Mamluk border/port city (*thaghr*) of Alexandria. Sultanal decrees issued to the Venetian doge (thus formally identified as an autonomous ruler under the sultan as his distant overlord) sketch out main elements of the Venetian community's status. The tributary relationship between Venice and the Mamluks was buttressed by the regular exchange of gifts and the sultan's institutionalised intervention in the pepper trade that turned it into some kind of tributary trade. Did the sultan abuse his power and sell pepper at an inflated price to the Venetians or did the parties merely exchange gifts reflecting their respective status? The operation thus remained ambiguous between tax, extortion, tribute and gift and open to multiple, divergent but complementary readings that undergirded the Veneto-Mamluk alliance. Thus, the Venetian community's head, the consul, was included into the Mamluk courtly taxonomy and received a respective stipend (CHRIST 2014a). Although he enjoyed the right to appeal to the sultan, he usually responded to and interacted with the local emir thus trying to settle problems locally through negotiation rather than sultanal fiat (CHRIST 2012a).

A council of twelve Venetian patricians, loosely based on Venetian institutions in the metropolis and other 'colonies', was meant to rule this community as some sort of bottom-up *universitas*. The de facto oligarchic governance structure rooted in the above-described power-asymmetry between the coalition of merchants controlling the pepper

trade and the wider Venetian community, however, threatened this autonomy. Reflecting the pragmatic cosmopolitanism of the wider Venetian community, non-patricians occasionally could sit on the council of twelve (CHRIST 2012a, 71, n. 75).

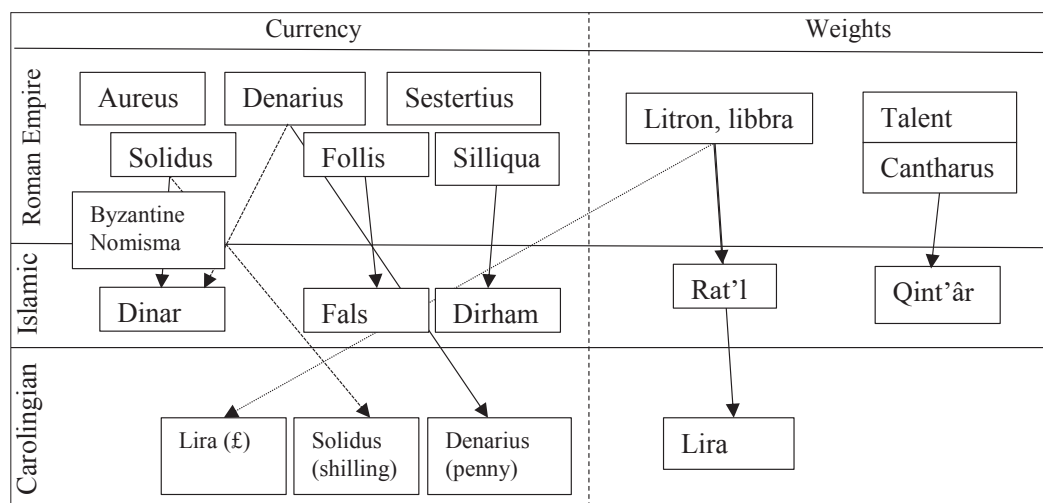
Mediating metrology

Linguistic barriers and the unfamiliarity with the local institutions and procedures of quality control might provide some explanation for the relatively complicated procedure of buying pepper on the market of Alexandria. Another was that the merchants of the above-mentioned group stayed in Alexandria for a longer period and thus could monitor the pepper price and engage in speculative practices thus securing claims on lots of pepper in advance of their arrival (CHRIST 2012a; 2012b). This goes some way in explaining why Venetian merchants travelling on the galleys relied on merchants established in Alexandria as mediators. The processing of the sultan's pepper but also the tightly state-regulated private pepper market with numerous officially or customarily defined taxes, dues, fees and tips (mainly to the Egyptian-Mamluk authorities and their local representatives but also to the Venetian community) was indeed intricate enough to require a modicum of familiarity with the system (SOPRACASA 2013).

The merchants active in Alexandria thus had to be familiar with this metrological landscape shaping interactions on the ground. Familiarity, however, was fostered by the layered metrological system. The classical Roman metrology provided the universal-imperial normative backbone to the system (see Fig. 6). It relied on the pound (*litron*, *libbra*) and talent as weights and a multi-metallic monetary system whereby the classical gold *aureus* of 25 silver *denarii* or 100 brass *sestertii* or 400 copper asses was less influential than the late imperial gold *solidus* of ca. 4.5 g, the increasingly debased denarius and the bronze *folles*. Islamic, Venetian and other trans-regional systems derived from this system, whereby Roman units lived on in Islamic Egypt (*cf.* HOCQUET 1999, 253-254): The *folles* copper coin became the *fals* and the *solidus* assumed the name of the *denarius* as the dinar gold coin; the *rat'l* was based on the pound and the *qint'ār*, the *cantharus*, was a double-talent. Venetian monies and weights also reflected the Carolingian universal-imperial legal metrology (*e. g.* £ both as monetary unit and weight). The Byzantine was another derivate of the Roman system.

The metrological landscape on the ground, *e. g.* in Alexandria, reflected all of the above-mentioned trans-regional metrological systems but significantly diverged from them in many minutiae. Furthermore, it was also differentiated horizontally. The Venetians thus had to navigate a three-dimensional metrological space and to translate horizontally

► Fig. 6. Historical development of main weights and currencies.



and vertically, not only language (the language of these transactions was probably mostly Arabic) but also weights, measures, and monies. The process of acquiring pepper thus was, in many ways, a process of translation.

Take the Venetian consul who paid petty amounts in dirhams:

Da' per mi a 'sta zima che fe' dar lizenzia di implier le zisterne deremi zinquanta val d. 50 [given by me to this supervisor, who provided the permission to fill the cisterns 50 dirham]

03 April 1419, ASVe, *Procuratori di San Marco*, Commissarie miste, b. 181, fasc. "1419", int. 20, c. [196].

It is not clear, however, what dirham this was: Was it the copper *dirham al fulûs* then circulating in Egypt, the canonical dirham, or one of the actual silver dirham coins in circulation at this time? Only combining it with other evidence (*e. g.* "E per ducato uno de' per inpir le zisterne: bisanti – carati xxii quarte 3")², it becomes clear that probably the silver half-dirham is meant. To complicate things further, money was culled (*i. e.* heavier pieces withdrawn from circulation), clipped and rubbed or coined badly in a poor alloy of a higher percentage of copper (in the case of the dirham, see also App.). Thus, face and real (intrinsic) value of a coin could diverge considerably. This was even true for ducats (STAHL 2000, chap. 10). A Venetian witness statement explains how the impact of a fine could have been mitigated by going to the market and getting the worst gold ducat pieces possible to pay the amount. The sum, clearly, had been stipulated as a sum of ducat coins in cash rather than as in a money of account (CHRIST 2012a, 245). A Venetian merchant had indeed been sentenced a little earlier precisely for clipping ducats in Alexandria (STAHL 2000, 233).

² Entry in a tax account, Angelo Michiel, 27 October 1418, ASVe, *Procuratori di San Marco*, Commissarie miste, b. 181, fasc. 13, int. n, f. [10].

Then, an amount, however paid, entered the Venetian expense accounts as pounds (£) and its fractions. These accounts were submitted to partners/masters or institutions in Venice. Venetian accounting in Alexandria also used the bezant as a money of account that did not mean the contemporary Byzantine bezant but the (canonical rather than real-existing) gold dinar. One could also encounter the *tornesello* (*tornese*, *tornesol*, *tornesel*) a Latin 'colonial' currency originating in Frankish Greece (see App.).

Venetian pepper trade, similarly, required acquaintance with different types of weights: The *qint'âr fulfuli i. e.* pepper (Arabic: *fulful* or *filfil*) *qint'âr* (hundredweight of the pound: *rat'l*, see App.) was the main measure used for dealing in pepper. The *qint'âr* as weight diverged from place to place and from commodity to commodity (besides the *qint'âr fulfuli* there were, for instance, the *q. jar-wî* for olive oil and the *q. laithî* for flax; ASHTOR 1982; HOCQUET 1999). After buying the spices in *qint'âr* on the markets of Alexandria, Venetian merchants had to translate pepper quantities into packages (*colli*) and bales (*sporte*) for internal usage, whereby the *sporta* also seems to derive from an Islamic measure of capacity, the *h'iml* (load).

In Venice, pepper was measured in *carghi* (another word for load – and different in weight, see App.). At the core of these transactions lay the sifting and weighing of the pepper. Sieves were used to clean the pepper from all sort of impurities (*tara*), although, in practice only samples were taken and the percentage defined as *tara* was ultimately a matter of negotiation (HOCQUET 1999, 259-260; CHRIST 2012a, 24; SOPRACASA 2013, 238-239). The fact that the *qint'âr* (theoretically a weight) is specified by a good (pepper) would indicate that the term might have (at least originally?) have been a dry-weight, *i. e.* a measure of capacity, similar to the contraption used to pack and measure cotton (HOCQUET 1999, 259). The weighing thus might actually have been a measuring with standardised devices (KULA 1986, 43; cf.

Arabic term	Venetian term (Alexandria)	Venetian terms (Venice)	English term	Bigger unit	Smaller unit	in g	Monetary equivalent
h'iml	sporta, carga cantaro siriano?		--	--	5 qint'âr; 720 libbre sottili	217; 225.9k	
		carico, cargo			400 libbre sottili	120.5k	
qint'âr folfoli	chantaro	centenaro	hundredweight (cwt)	h'iml, sporta ($\frac{1}{5}$)	100 rat'l	45k	
rat'l folfoli	rotolo [litron]	(libbra grossa)	(heavy) pound	qint'âr folfoli ($\frac{1}{100}$)	12 ûqiya	450 (477.08)	lira
		libbra sottile	(light) pound			301.28	
ûqiya	onça, oncia		ounce	rat'l folfoli ($\frac{1}{12}$)	12 dirham	37.5	
		onça, oncia (of the l. grossa)		libbra grossa ($\frac{1}{12}$)	192 carati	39.75	
		onça, oncia (of the l. sottile)		libbra sottile ($\frac{1}{12}$)	8 dramme	25.102	
mithqâl	--	soldo? (weight)	solidus (weight)	nisâb? ($\frac{1}{20}$) rat'l (rûm'i) ($\frac{1}{2}$)	24 carati or 1 ½ dirham	4.68 (canonical-ly 4.464)	dinar 4.233; ducat 3.5; gigliato 4
dirham (weight)	peso	dramma?	drachma	ûqiya ($\frac{1}{12}$)	16 carati; scrupoli?	3.125, canonically 3 (or 2.975); 3.1378	dirham 2.97; grosso 2.18
							half- dirham 1.3; soldino 1, tornesello 0.75
qîrât' (from Greek: keration, carob seed)	carato	carato	carat	dirham (weight)	4 grani	0.2	denaro 0.3

VELKAR 2020, 82-83 for similarly different modern bushels) (Tab. 3).

Differences in weights, measures and monies were considerable but it would seem that, ultimately, they did not significantly hamper trade. Why? The measures employed in Alexandria apparently were familiar enough to the Venetian who travelled to the Levant, as most units referred to the overarching, shared metrological koiné. Nevertheless, pepper trade in the Levant required a modicum of specific, local metrological knowledge. There were differences between local metrologies in Venice and Alexandria; various weights, monies, and measures coexisted and which to use changed not only from place to place but also from one group of merchant to the other and from commodity to commodity. Newcomers thus might have found it tricky to handle this system despite a certain basic familiarity with the overarching common reference units.

Consequently, these differences, alongside linguistic barriers and normative/customary differences, might have contributed to a concentration of negotiating and contracting in the hands of a coalition of a few Venetian patrician merchants and their intermediaries, as stated above. This coalition brought together particularly experienced (and wealthy) long-term residents and some of their non-Patrician partners, who even spoke

Arabic (CHRIST 2012a, CHRIST 2012b). Metrological differences, however, were probably only the smallest contributing factor in the rise of such a coalition. The comparative advantage rather relied on a long-term presence, year-long monitoring of and speculating on the pepper market, the importance of a strong network of partners beyond the Venetian community and familiarity with the local markets and procedures. These were arguably the more decisive drivers of this specialisation. In any case, Venetians complained about many things 'other' in Alexandria but metrological difference was not one of them.

Risk management

The specialists and the wider mercantile community knew the costs and risks of transactions in Alexandria relatively well. From the 14th century onwards, this information was also compiled in written guides, most prominently the late 15th century most detailed *tariffe* specifying down to the last petty payment the costs for the various procedures of purchasing, loading and shipping pepper (SOPRACASA 2013). When transporting pepper legally via the state galleys, the risk of losses through piracy seems to have been very low, almost negligible (CHRIST 2010), the risk of

▲ Tab. 3. *Taxonomy of weights relevant for Venetian pepper trade in Alexandria – non exhaustive (for references, see App.).*

shipwreck was slightly higher but still manageable (see GLUZMAN no date). Alternatively (although illegally) merchants could ship goods by private craft. This might have increased the risk, but it did not prevent merchants from doing it (CHRIST 2010; 2018). They could of course mitigate the risk by splitting the merchandise into smaller parcels and transporting them via different carriers and routes.

The biggest risk arguably was due to speculation, *i. e.* the possibility that pepper would not arrive in time for the *muda*. For pepper supply was irregular in Alexandria. It depended on the availability of pepper in the Red Sea region, which in turn was determined by local political conditions and related security concerns, the monsoon system, and conditions in India. Onward transportation from the Red Sea depended on the timing of the Nile flood (which was dependent again on the Monsoon *i. e.*, ultimately, shifts of the Intertropical Convergence Zone) as river-bound transport (especially on the last stretch from Cairo to Alexandria) was much easier during the Nile flood. It also depended on the timing of the pilgrimage to Mecca and Medina (*hajj*) which, of course, depended on the Islamic lunar Hegira (*Hijra*) calendar. As a result, there was a great deal of uncertainty regarding the expected pepper supply at the autumn fair. This could set off dangerous speculative cycles of forward purchases effected by the already mentioned coalition of dominating long-term residents, which could profit from these risks (see CHRIST 2012b).

Yet did this coalition at least resolve the problem of translation and, if so, how? The way long-term residents tried to optimise their gains was through the above-mentioned, speculative forward purchases and channelling pepper through alternative albeit illegal modes of transport. Forward purchases, however, meant highly speculative future trading. Speculation thus was a double-edged sword. It not only communicated expectations and thus formed realistic prices but was also (contrary to how the Efficient Market Hypothesis would have it) at the root of speculative bubbles leading to vast discrepancies in expected and effectively paid prices at the pepper fair. This caused acrimonious conflicts over how to deal with the resulting losses between merchants (some might call them agents) in Alexandria and their partners (masters) in Venice but also between the Venetian community and Mamluk merchants and authorities. There were different views about this (to blame, of course, was always the other, preferably the infidel and thus notoriously untrustworthy other). Different solutions were proposed. They roughly oscillated between free trade/*laissez-faire* and community/state action by either the local Venetian community or the Venetian city-state (CHRIST 2012a, 229-249). The compromise, however, often seems to have been to communalise the debt – such was

the power and recklessness of the leading coalition – distantly mirroring some of our own banks' behaviour in the recent financial crisis. Thus the communal fund of the Venetians in Alexandria, the *cottimo*, increasingly carried a ballooning debt. Because of this and other problematic practices, this fund was heavily in debt by the end of the 15th century thus triggering the intervention by metropolitan institutions in Venice (APELLÁNIZ 2009a, 242). These practices thus also highlight, perhaps, the lack of institutional continuity of the Venetian presence in Alexandria and both the *Serenissima's* and the sultan's inability or unwillingness to effectively contain and control it.

Business intelligence, *e. g.* on the pepper supply in the Red Sea region, could mitigate this problem, although occasional false news could also exacerbate it. In order to gather such intelligence the consul, but also individual merchants, engaged in extensive business correspondence but also dispatched representatives to Cairo in order to obtain better information (CHRIST 2014b).

Conclusion

Linguistic, normative, and practical (including metrological) differences in Alexandria might have contributed a quantum to problems of translation and unfamiliarity but it is difficult to find evidence for a strong and sustained negative impact on trade. It seems that the landscape of unity in diversity in practices was familiar to the mercantile actors of the Egyptian port city. This diversity, in any case, would not have particularly puzzled a 15th century merchant, who customarily dealt with many different local measures, monies, and weights at home or in less far removed trading places. The overarching canonical or imperial framework of basic weights, measures and moneys and the shared legal-cultural *koiné* of the Roman Empire provided a shared understanding from which one could negotiate and navigate difference with relative ease.

The local metrological variety thus was arguably among the smaller problems a merchant would encounter. The coalition of Venetian patricians, *cittadini* and adopted Venetians residing in Alexandria gained power as gatekeepers and facilitators for other reasons including the necessity to deal with the risks associated with the pepper trade, linguistic difficulties and social-institutional complexity. These people were more than the often-employed term 'agent' would imply. They were not the passive executors of instructions received from 'sedentary merchants' in Venice. They shaped trade actively and maintained their own wide-spanning commercial activities across a wider trade network. They were partners and could even be the senior partner. In this game, expertise of taxonomies, commodities and measures of a

different kind were paramount; to be conversant in the local language and metrology of trust, fed by continuous interaction and exchange of favours, services and gifts. In this tit-for-tat economy, they lubricated the everyday procedures that diverged similarly from the norms stipulated in the official diplomatic instruments that Venice obtained from the sultan as the Alexandrian pepper *rat'l* diverged from the Egyptian or the canonical Islamic *rat'l*.

The mediation by these Veneto-Alexandrians was not always appreciated in Venice. They were notoriously distrusted and perhaps the merchant manuals detailing customs and trading procedures, the *tariffe*, made available in SOPRACASA'S 2013 magisterial edition, were a tool to control them. Whether Venetian metropolitan distrust of these intermediaries grew proportionally with the debt of the *cottimo* I cannot say, although it is interesting that the published *tariffe* date from the late 15th century, *i. e.* shortly before the reorganisation of the *cottimo* and the attempt to establish tighter bureaucratic metropolitan control over the Venetian community in Alexandria.

The metrological landscape reflects a situation of layered statehood with a balanced distribution of power horizontally and vertically (see Fig. 1). It reflects a situation, also somewhat alluded to in notarial documents, of citizen-merchants of trading cities (*civitates*) dealing with each other on the basis of a shared civic-mercantile identity, perhaps deontology, a legal-cultural koiné under an imperial, 'civilisational' umbrella guaranteeing freedom of movement and contracts. A shared understanding of what, ideally, a dirham or dinar/*mithqāl* ought to be, helped to deal with real-life dirhams on the ground. A shared understanding of the basic tenets of mercantile ethics helped to deal with merchants incurring debts in the wake of risky future trading. The faint memory of a shared imperial belonging, of a *mare nostrum* helped merchants to navigate the Euromediterranean concretely and metaphorically. The shadow of empire thus propped-up the idea and (limited) reality of a trade area in which merchant *cives* of *civitates* across the Mediterranean enjoyed a degree of freedom of movement and trade.

The unity in diversity of the metrological landscape thus reflects how a transregional trade system can be rooted in an overarching empire, if only the universal empire of the cosmopolis (see also KANT 1795). Such an empire can (and should) be loose; its backbones are a network of *civitates* (ABU-LUGHOD 1989), while the nation state in this system seems less important, almost dispensable. Enabling unity in diversity between city-level polities within a wider cosmopolitan framing today might enable more sustainable solutions for international trade that could mitigate ecological and economic collapse tomorrow.

Appendix: Monies, measures and weights used by Venetians in Alexandria at the beginning of the 15th century

This appendix originated as a personal reference tool to navigate weights, measures and monies used in the documents of the "Commissaria Biagio Dolfin". It is thus extremely limited in its scope and validity; it provides merely some sort of a snap-shot of the situation Biagio Dolfin encountered in Alexandria 1418-1420. It does not claim in any way to be comprehensive or definite. For a more detailed assessment the reader is encouraged to consult the rich and here partially indicated literature, mainly (albeit for a slightly later period) SOPRACASA 2013.

Monies

As money of account only (*cf.* "ma fu moneta di conto", MARTINORI 1977, 51) the Venetians in Alexandria used the traditional Byzantine gold denomination (gold *solidus* or *nomisma*, since the 11th century: *hyperperon*), the bezant. The Venetians called it *bisante* and divided it like the Venetian money of account in Constantinople, the *perpero* (DA UZZANO 1766, 110-111; GRIERSON 1999, 11). The bezant should not be confused with the numerous silver-*perperi* (minted or money of account) of less value (BERTELE 1973, 107; *cf.* MORRISON 2001, 220-222). Its subordinate units were:

1 *bisante* (abbreviated: b., bx. here: bx.) = 24 *carati* (carat; abbreviated: k.)

1 carat = 4 *quartae*

One would wonder whether the ducat should also be included as a Venetian money of account, for instance in the context of galleys transporting species (LANE/MUELLER 1985, 334-336). In the documents studied for the purpose of this investigation, however, there is no evidence for that. In what follows, ducat thus always refers to the real-existing Venetian gold coin in circulation.

The money of account of the Mamluk officials was the dinar, which does not appear, as such, in the Venetian sources. Yet it was essentially equivalent to the bezant of Alexandria (*cf.* *bexantti vechi*, SOPRACASA 2013, 752), which makes sense as the dinar was similarly based on the Roman *solidus* (HINZ 1970, 1-2). Minting of gold-coins was never interrupted in Egypt for any extended period or in principle (BACHARACH 1973; SCHULTZ 1998, 334); the fact that no Arabic coins appear in the Venetian sources could be explained by hoarding (also indicated by Schultz).

1 gold dinar (canonical) = 1 *mithqāl* (money weight did not equal commercial weight, *i. e.* the weight used for weighing other commodities, see below) = 4,233 g = 24 gold-*qīntār*³

3 The bezant/dinar did roughly correspond with the 11th to 13th century gold hyperpyron of 4.13-4.30 g, see GRIERSON 1999, 11-12.

1 (canonical) silver *dirham* = 2.97 g = 2 half-*dirhams* or 4 quarter-*dirhams* (BALOG 1961, 135, 138-139; HINZ 1970, 2).⁴

The half-*dirham* weighed, according to BALOG (1961, 138), 1.3 g with a fineness of 90-95 %.⁵ This coin seems to have been more common than the *Mu'ayyadi* silver *dirham*, with a fineness giving it the value of 0.9 canonical *dirham* (2.63 g; 90-95 % silver).⁶ SHOSHAN (1986, 43-45), however, (but without quoting Balog), seems to imply that these were worn-out *dirhams* containing only a small proportion of silver in comparison with the preserved *mu'ayyadi* silver *dirhams*. However, coin hoards do not support this claim. Abrasion or the practise of clipping the coins down to half of their initial value is also rather improbable.⁷

The ratio of the gold dinar with respect to the money of account, based on the silver coins was:

1 canonical gold dinar = 20 canonical silver *dirhams* (HINZ 1970, 2). *I. e.* that would be the same ratio as and might have been as important an inspiration for the original Florentine florin being equivalent to 20 *grossi* as the Carolingian ratio of 20 *solidi* to the *lira*. Ultimately, they were both rooted in the Roman system of minting 240 silver *denarii* from a pound (*libbra*) and the various late Roman *silliqua* coins of about 2-3 g that might have inspired the minting of the *dirham*.

In Egyptian everyday life, however, people used copper money (*fals*, pl. *fulūs*). Confusingly also this money often ran under the name of *dirham*. Such trade-, or copper-*dirham* and the half-*dirham* circulated, while the few *Mu'ayyadi-dirhams* (*maidī*, *maidīnī*, SOPRACASA 2013, 757) and gold pieces were probably hoarded (Gresham's law).⁸

It is unclear what the *dirham (min) al-fulūs* was. The exchange rate of this copper *dirham* with respect to the dinar in 1419 was officially 230:1, but unofficially, according to the research literature up to 280 *dirham min al-fulūs* were valued at 1 dinar.⁹

⁴ There obviously were also other fractions: for instance, the three-quarter-eighth-*dirham*, SCHULTZ 1998, 336.

⁵ Always under the assumption that $\frac{1}{2}$ canonical *dirham* equalled 1 *derem* (1.2375), which is pretty close to Balog's half-*dirham*, see below.

⁶ 123 preserved half-*dirham* compared to 23 *dirham*, BALOG 1961, 138-139; the canonical *dirham* is as shown above 2.97 g; BALOG 1961, 135, 138-139; HINZ 1970, 2.

⁷ Cf. SCHULTZ 1998, 336, which seems to confirm Balog (see above).

⁸ The so-called Gresham's law states that the bad money is driving out the good money (the good money is hoarded while everyone tries to get rid of the bad money as quickly as possible, enhancing its circulation).

⁹ Normally, 250 to the canonical gold-dinar: AL-QALQASHANDI 1879, 144; cf. ASHTOR 1969, 277; 250 to the gold-dinar but 230 to the ducat were arbitrary exchange rates set by the sultan. BACHARACH 1973, 82; following MAQRIZI 1934-1973, vol. IV, 196; SHOSHAN (1986, 33, tab. 31), however, calculates 230 *dirham* to the gold-dinar, and 210 to the ducat; BACHARACH (1973, 82) opines that the market exchange rate were about 10-15 units below the official exchange rate; SPUFFORD *et al.* (1986, 304) final-

The canonical *dirham* would therefore have gone at 11.5-14 *dirham min al-fulūs*.¹⁰ It is not clear what that meant: a pile of *fals* copper coins weighing 11.5-14 commodity-*dirham* or 11.5-14 copper coins. Perhaps the *dirham min al-fulūs* had first been proper copper coin weighing 1 commodity-*dirham*, *i. e.* about 3 g as stated by SHOSHAN (1982, 113). By and by, the value of these copper coins might have decreased and so they were measured by their intrinsic value (*i. e.* weight). Had the *dirham al-fulūs* thus become a measure of weight, for an amount of copper money weighing 1 commodity *dirham*? It would thus have served as a stable auxiliary conversion unit (although not necessarily as a money of account) hardly affected by depreciation and inflation.¹¹

The Venetian silver currency was initially based on the Carolingian silver pound (1 *lira* = 20 *solidi* = 240 *denari*, see SPUFFORD *et al.* 1986, 85) but in practice, it was substantially altered and became bimetallic (copper-strong *piccoli* vs. silver-strong *grossi*). After 1379, Venetian accounts were kept in the *lira di piccoli*, the *lira di grossi a monete*, and the *lira di grossi a oro/ducato a monete* (LANE/MUELLER 1985, 1, 352-354). Documents seldom indicate which system of account is being used; generally the *lira di piccoli* was used for small purchases or traditional charges within Venice, and the two *lire di grossi* for large-scale commercial transactions (LANE-MUELLER 1985, 1, 334, 354-355). The two *lire di grossi* were related by the relative value of gold to silver, expressed as the number of *soldini (a monete)* to the ducat, a figure quoted as the *aggio/lazio* daily at the Rialto and in Venetian markets around the Mediterranean, in 1418-1420 oscillating between 100 and 140 (cf. LANE-MUELLER 1985, 1, 329, 604-605, tab. D.3 and see below).

1 *lira di piccoli* = 20 *soldini* = 240 *denari piccoli*

1 *lira di grossi a monete* = 240 *grossi* ("new" *grossi*) = 960 *soldini* = 11,520 *denari piccolo*

The *grosso* of 1.99 g (STAHL 2000, 70) was designed as the 'link coin' to real silver money and was valued at 4 *soldini*, *i. e.* 48 *denari piccolo* (and thus came at 1.5 old *denari grossi*), while, for instance, the *piccolo* of the accounts did not match the value of the physical *piccoli* in circulation (LANE/MUELLER 1985, 1, 352-354).

ly, invoking Bacharach, proposes a band-width of 230-280 *dirham* per dinar; SOPRACASA (2013, 753) for the late 15th century values the d. al fulūs even at 300 per ducat.

¹⁰ BALOG (1961, 133) however, equates 1 canonical *dirham* = 48 *fals*.

¹¹ According to SHOSHAN (1986, 30) as a result of devaluations, the copper currency became a money of account, in which each unit stood for a couple of bad copper-coins; SCHULTZ (1998, 337-338; 1999, 183-205, here 188) emphasises the stability of the *dirham al fulūs* because it stood for the intrinsic value of weighed copper coins. He opines that it stood for copper valuing 1 canonical silver *dirham* which, however, is difficult to match with the evidence cited above. He calls it a money of account which perhaps is an over-statement as long as we do not have corroborating evidence, *i. e.* Mamluk accounts.

1 *lira di grossi a oro* = 10 gold ducats
 1 ducat = 24 *grossi a oro* = 96 *soldi a oro* =
 1,152 *denari a oro*

Also in use was the *tornese* (*tornese*) worth 3 *denari piccoli* imitating and succeeding a heavily debased livre tournois that had been minted in Frankish Greece until the early 14th century. It was a billon coin of about 11 % silver, weighing 0.75 g, introduced for the Venetian colonies in Greece and soon became the dominating lightweight coin in the Aegean (STAHL 1985; GRIERSON 1991; see also notarial deed Abraham qd. Moise, 10.04.1420, ASVe, *Cancellaria inferiore*, Notai, b. 22, fasc. 9, int. 3, ff. 9-10).

In the Alexandrian-Venetian overseas trade, the Venetian ducat (*ducato*) was the most widely used coin, as shown by cargo lists and descriptions of payments.¹² By the early 15th century it had also become the most widely used gold coin in Egypt (VAN GENNEP 1897).

At the beginning of the 15th century, the exchange rate of the Venetian pound (*lira di grossi*) with the ducat was roughly:

1 ducat = 18-18.25 *grossi* = 100-104 *soldini*¹³

In Alexandria, in the years around 1419, the ducat was valued about 0.94 bezants (22.5-22.75 carats, *i. e.* 22 carats and 3 *quartae*),¹⁴ despite its lower weight compared to the ideal gold-dinar or *bezant* (the ducat weighed, being of the same fineness, only 3.51 g rather than the canonical dinar weight of 4.25 g), which would mean an expected exchange rate of 0.825.¹⁵

Consequently, the ducat should have been worth 18.8 canonical silver *dirhams*¹⁶ or 206.8 *dirham min al-fulûs*. Research literature, however, reports an official exchange rate of 210, and unofficial rates of up to 260 *dirham min al-fulûs*.¹⁷ This would suggest that the ducat was strongly overvalued.

In the Venetian sources, the term *deremi* appears often. It remains to be clarified which type of *dirham* is meant. We propose that it was the minted half-*dirham*. The evidence corroborates this hypothesis without, however, being at all consistent: Remunerations for messengers from Cairo to Alexandria regularly amounted to 35 *dirham*, in one case 1 ducat, and in two cases 2 ducats. It is not clear, though, whether some payments might have also included a daily ration, which is often specified separately.¹⁸ For filling the cisterns with water, the Venetian consul paid sometimes 50 *deremi*, sometimes 1 ducat, indicating an approximate ratio of 1 ducat to 50 *deremi*.¹⁹ Other evidence ascertains that 2 *deremi* equalled about 1 carat, or 1 *qintâr* (and 48 *deremi* 1 bezant/dinar; 45.1 *deremi* 1 ducat).²⁰ Hence, the evidence suggests an exchange rate of about 48-50 *deremi* per ducat.²¹

Therefore, the Venetian term *derem* can hardly mean copper coins, but rather slightly deteriorated silver half-*dirhams* valuing about 0.42 canonical *dirhams*, which is consistent with SOPRACASA (2013, 753-754). This results in the following calculations:

1 (ideal) gold-dinar/bezant (*i. e.* of account)
 = 20 canonical *dirham* = 40 canonical
 half-*dirham*, but 48-50 minted half-*dirhams*
 (or *deremi*) = 230 *dirham min al-fulûs*
 (official exchange rate)

1 ducat = 18.8 canonical *dirham*/18-18.25
*grossi*²² = 45.1 to 50 minted half-*dirham* =
 100-104 *soldini* (*a moneta?*) = 210 *dirham*

12 While the value of commodities in the cargo are indicated in *denari di grosso*, ducats are listed as commodities, cf. Cargo list of the cog of Luca Falier, 29 May 1419, ASVe, Procuratori di San Marco, Commissarie miste, b. 181, fasc. 13, int. "carichi", f. [9]. It is unclear to which extent silver coins and silver ingots were brought to Egypt at this time. Later, this was to become customary as the Venetians could make a greater profit on silver than on gold, see ARBEL 2004.

13 SPUFFORD *et al.* 1986, 84-86; cf., however "a raxon de grossi 27, picoli 16 el bisante" account, ASVe, Procuratori di San Marco, Commissarie miste, b. 181, "Commissaria Biagio Dolfin", fasc. 16, int. e, f. [7, 9] showing an even stronger evaluation.

14 0.94663461; 0.9376; 0.9438465; 0.94707692; 0.935333; according to the letter of Biagio Dolfin to Nicolò Dolfin, December 1419, ASVe, Procuratori di San Marco, Commissarie miste, b. 181, "Commissaria Biagio Dolfin", fasc. 15, int. e, f. [16]; "charati 22 picoli 3 per ducato; (...) a raxon de grossi 27, picoli 16 el bisante" *ibid.*, f. [7, 9]; cf. accounts, *ibid.*, fasc. 24, int. n, *passim*; SPUFFORD *et al.* 1986: 1 bezant = 1.17-1.25 ducat; SOPRACASA 2013, 753: 20 carats per ducat.

15 IBN H'AJAR (1969, vol. 3, 174) indicated a weight of 0.825 *mithqâl*, reflecting the official exchange rate; from 1409 onwards the ducat was assessed to be worth more than 90 % of the *mithqâl i. e.* the gold-dinar, cf. BACHARACH 1973, 83-84. At the end of the 13th century 1 ducat had been assessed to be worth significantly less than the (*doplla*) *bisantio*, *i. e.* *perpero* (52 *soldi* vs. 68 *soldi*), LANE/MUELLER 1985, 304-305; cf. "e correvi una moneta che si ragiona a bisanti, che meglio grana 2 chel ducato. (...) Tutte cose si vendono in Alessandria a bisanti, che vale uno ducato, uno e un' ottavo in uno e un terzo, secondo il bisogno." DA UZZANO 1766, 110-111.

16 Only 13-15 following the official exchange rate, according to SHOSHAN (1986, 44); the market value was somewhat higher.

17 Cf. the official exchange rate of 210 *dirham al-fulûs* per ducat; the market exchange rate must have been at least 10 *dirhams* higher, *ibid.*: 33; the ratio was 210-260 according to SPUFFORD *et al.* (1986, 305).

18 For instance 22 March 1419, ASVe, Procuratori di San Marco, Commissarie miste, b. 181, fasc. "1419", c. [18]; 9 August 1419, *ibid.* c. [104]; 2 September 1419, *ibid.*, int. 16, c. [175]; letter of Filippo di Malerbi to Biagio Dolfin, 25 February 1419, *ibid.*, fasc. 15, int. d, f. [43].

19 "E per ducato uno dè per inpir le zisterne bisanti [0], carati xxii, quartae 3" tax account Angelo Michiel, 27 October 1418, *ibid.*, fasc. 23, int. n, f. [10]; "da per mi a 'sta zima che fe' dar licenzia di implir le zisterne deremi (...) 50" petty cash payment, 3 April 1419, *ibid.*, fasc. "1419", int. 18, c. [196]; over 75 *dirham*: 12 June 1419, *ibid.*, c. [94].

20 Cf. 12 *dirham* = 7 carat, customs declaration by Marco Bembo, *ibid.*, "Commissaria Biagio Dolfin", fasc. 23, int. n.

21 This would maybe explain the odd exchange rate 1 ashrafi (gold) dinar = 60 *dirhams* of 1403: SPUFFORD *et al.* 1986.

22 In 1384 *dirham* and *grosso* were apparently considered to be of equal value: SPUFFORD *et al.* 1986, n. 267.

min al-fulūs (official exchange rate) but 146.6-237.5 (market rate).²³

Measures of capacity, quantity and standard parcels

For loading onto the Venetian ships, the sifted pure pepper was put in bags (*sacco*). We also find terms for parcel (*collo* or *pondo*). Often, these two terms are synonymous. However, the Syrian *collo* was only about half of the Egyptian *pondo* in the 15th century. Depending on the estimates, the *pondo* (abbreviated: p^o) of pepper would have weighed between 130 and 500, normally 180 kg.²⁴ A *sporta* (217-225 kg) of purchased pepper probably yielded – depending on the quality – ca. 1 to 1 ¼ *pondo*, once the raw pepper was cleaned of admixtures (*tara*).²⁵

For certain products, such as furs, the Venetians used the *mier* (thousand weight) of an unclear weight.²⁶ Wine was measured in *botte*. 1 *botta* = 675.32 l = 56 *mastelli* (HOCQUET 1995, 84).

Weights

Arabic standard weights, which varied dramatically according to local customs, were applied in the following way in Alexandria:

Qint'âr (ven. *cantaro*: centenarium (HOCQUET 1999, 248), centner, i. e. hundredweight, cwt, quintal) = 100 *rat'l* (the Greek litron, pound). There were, however, different *rat'l*s and thus different hundredweights. Besides the *rat'l al laithi* (*rotolo leudi*) of 0.62 kg = 200 dirham (drachma, as measure of weight), there was also the *rat'l al jarwî* (*rotolo gervi*) of 0.97 kg = 312 *dirhams* and the *rat'l kabîr* = 0.5 kg = 160 *dirhams* (BORLANDI 1936, 99-102; HINZ 1970, 25; HOCQUET 1995, 102-103). The *rotolo al forfaro* or *folfolo* (i. e. of *ful-ful* = pepper) was of 0.45 kg.²⁷ Thus, the *dirham* (as a measure of weight) was 3.12 g (HINZ 1970, 3), and the hundredweight varied from 50 to 97 kg, i. e. from a metric half-hundredweight to a metric hundredweight.²⁸ A much greater *qint'âr* or, rather,

cantaro (*siriano*) of ca. 750 *libbre sottili* reported in several merchant manuals (HOCQUET 1999, 256-258), seems to be the weight equivalent of the *sporta* (see Tab. 2 below).

The *mann* was less important: *qint'âr* (*cantaro di mena*) = 81.25 kg = 100 *mann* (= *rat'l* of Baghdad, this was not common in Egypt); 1 *mann* = 260 *dirhams* (HINZ 1970, 16).

Pepper and other spices were weighed in the pepper-*rat'l*, as bigger, superior weight served the *sporta* (pepper-cargo):

1 *sporta/h'iml* (load) = 217 (HINZ 1970, 33: 225) kg²⁹ = 5 *qint'âr fulfuli* (PEGOLOTTI 1936, 71 (57-58)) = 500 *rat'l fulfuli*
1 *qint'âr fulfuli* = 45 kg = 100 *rat'l*³⁰ = 14400 *dirham*
1 *rat'l fulfuli* = 450 g³¹ = 144 *dirham*³²

This results in the following rates of Venetian and Alexandrian weights:

1 *sporta* = 715-720 Venetian *libbre sottili*,³³ respectively ca. 480 Venetian *libbre grosse*. The *rat'l* (= 0.45 kg), however, was some sort of equivalent but not exactly of the same weight as the Venetian *libbra grossa* (= 0.477 kg) (= 12 ounces of 39.7 g), see WANSBROUGH 1963, 525; HOCQUET 1995, 103.

The pepper sold in Venice was measured in yet another Venetian supermeasure: *carghi* (*carico* = cargo = 400 *libbre sottili*) of 120.5 kg and thus much different from the Oriental *sporta*.³⁴

For precious metals, stones, pearls *etc.* the finer commodity weights were applied:

The *mithqâl* of 4.68 g (canonically 4.464 g) = 24 carat or 1 ½ *dirham* respectively, scarcely appears. The ounce (*ûqiya*) equalled in Egypt 12 *dirhams* = 37.5 g (MARTINI 1883, 128).

Measures used for general merchandise in Venice:

Libbra grossa = 477.08 g (for metals, cloth, oil *etc.*)

23 According to SHOSHAN (1986, 40) 1 ducat was officially less than 15 canonical *dirham*, but unofficially it must have been traded for more than 20, namely 24.7 canonical *dirham*. Only then would it have resulted in the assumed 7 ½ - 9 ½ *dirham al-fulūs* per Mu'ayyid-silver-*dirham* yielding the documented, official exchange rate with the ducat of 210.

24 ASHTOR 1983, 182, 470, n. 223; cf. ASHTOR 1978, 575-578; 1982, 482-483; HOCQUET (1999, 269) calculated for Constantinople a weight of 427-475 *libbre sottili* for the pepper-*pondo*, i. e. only 130 kg.

25 For the problem of the admixtures (*tara*): HOCQUET 1999, 269-271.

26 "Per miera VI de vari", payment note, Biagio Dolfin, 1419, ASVe, Procuratori di San Marco, Commissarie miste, b. 181, fasc. 23; cf. SOPRACASA 2013, 734, of *libbre grosse* or *sottili*, also HOCQUET 1999, 257; 25 *libbre grosse*: BATTAGLIA 1961, s. v. "miera"; cf. 15.8 l (= ca. 33 *libbre grosse*): MARTINI 1883, 818.

27 The respective *qintar* weighed 144 Venetian *libbre sottili*: DA UZZANO 1766, 109.

28 For more detail and the Venetian use of the *cantaro* (*siriano*) i. e. of over-seas trade, see HOCQUET 1999, 255-258.

29 Labib, equalises the *sporta* convincingly with the *h'iml*, LABIB 1965, 356; the *h'iml* weighs in Egypt for pepper 500 *rat'l*, HINZ 1970, 13; HOCQUET (1999, 255) calculates with Pegolotti: 225.9 kg.

30 MARTINI (1883, 127) calculates differently: 102 and 7/8 *rat'l*, which applied probably only in later periods.

31 0.44 kg, *ibid.*, 128; 0.413-0.437 kg; ASHTOR 1982, 472; 0.451872 kg, HOCQUET 1995, 104.

32 HINZ 1970, 25, 29, 33; MARTINI 1883, 128 differing: 140 *dirham*.

33 HINZ 1970, 33; 700 *libbre sottili*: DA UZZANO 1766, 109; PEGOLOTTI 1936, 74 (61); HOCQUET 1995, 103; 1 *cantaro* = 143-144 *libbre sottili*, i. e. 1 *sporta* = 715-720 *libbre sottili*, could also be called *carga*, HOCQUET 1999, 248, 254; SOPRACASA 2013, 724.

34 «Piper val duc. 84 el cargo» Letter Nicolò qd. Benedetto Dolfin to Biagio qd. Lorenzo Dolfin, 27.10.1418, ASVe, Procuratori di San Marco, Commissarie miste, b. 181, fasc. 15, int. d, f. [5]. Mostly, however, *cargo* is used as a generic term not unlike the English word 'cargo' today, cf. carica: MARTINI 1883, 818; HOCQUET 1999, 254 equals the *sporta* as described above with the *carga*; LANE/MUELLER 1985, 357.

Libbra sottile = 301.28 g (for spices *etc.*), inspired by the Roman *libra* 327.45 g, both = 12 ounces (HOCQUET 1999, 249 gives 301.94 g for the *l. sottile*; ounces: 249-250, 284; also MARTINI 1883, 818).

For money and precious metals:

onça, oncia (ounce) = 121.1 (144) *carati* = 25.0745 g (30 g; 39.7 g)

carato = 4 *grani* (grains) = 0.2068 g (LANE/MUELLER 1985, 526; HOCQUET 1995, 89, 103; 1999, 250).

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Reference link fig. 3

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Cowries and blood

Money, value, and relationships in precolonial East Africa

by SIBEL KUSIMBA & CHAPURUKHA M. KUSIMBA

Money, merchants, East Africa, Swahili, Indian Ocean trade, blood brotherhoods

Merchants and their strategies are at the heart of precolonial East African trade networks. In precolonial times, these networks connected coastal urban cities and diverse hinterland communities. Goods traded over the last two millennia included foodstuffs, beads, textiles, elephant ivory, and tragically also enslaved people. Over time these local networks also amalgamated with Indian Ocean and European trading systems. The East African landscape was a multi-ethnic mosaic of interaction and trade.

We argue that money was an important part of the social and economic strategies of these merchants. In archaeological interpretation, money objects recovered from archaeological sites usually signal economic and commercial practices. In this article, we expand the definition of money and the interpretation of money in archaeology. Instead of placing the means of exchange and the function of money objects at the center of our analysis, we will instead focus on money as a means of payment. From this perspective, we argue that money was used to create networks of relationships and symbolise the character of these relationships. Exchange of value in multiple forms, including livestock, coinage, beads, cowries, textiles, and even human blood, was a key strategy of merchants in producing the social networks of trade.

In this paper we productively combine archaeological and ethnographic evidence of precolonial trade with a conceptual framework around multiple monies as relational payments. After an introduction to the setting and the evidence of precolonial East Africa, we then theoretically describe the idea of money as a means of payment, the diversity of monies, and the idea of the social meaning of money. Through the lens of merchant strategies and money-like materials and objects, this paper re-situates eurocentric accounts of monetary history, revealing the agency of merchants in shaping social networks and relational spheres of influence in East Africa.

Kaurischnecken und Blut: Geld, Wert und Beziehungen im vorkolonialen Ostafrika

Geld, Kaufleute, Ostafrika, Suaheli, Handel im Indischen Ozean, Blutsbrüderschaften

Die Händler und ihre Strategien bilden das Zentrum der vorkolonialen ostafrikanischen Handelsnetze. In vorkolonialen Zeiten verbanden diese Netzwerke städtische Küstenorte und Gemeinschaften im Hinterland. Zu den Waren, die in den letzten zwei Jahrtausenden gehandelt wurden, gehörten Nahrungsmittel, Perlen, Textilien, Elefantenebenbein und tragischerweise auch versklavte Menschen. Mit der Zeit gliederten sich die lokalen Netzwerke an die europäischen Handelssysteme und die des Indischen Ozeans an. Die ostafrikanische Landschaft war ein multiethnisches Mosaik aus Interaktion und Handel.

In diesem Beitrag argumentieren wir, dass Geld ein wichtiger Teil der sozialen und wirtschaftlichen Strategien der Händler war. In der archäologischen Interpretation signalisieren Geldobjekte, die in archäologischen Fundstellen geborgen wurden, in der Regel wirtschaftliche und kommerzielle Praktiken. In diesem Artikel erweitern wir die Definition von Geld und die Interpretation von Geld in der Archäologie. Anstatt die Tauschmittelfunktion von Geldobjekten in den Mittelpunkt der Analyse zu stellen, konzentrieren wir uns stattdessen auf Geld als Zahlungsmittel. Aus dieser Perspektive argumentieren wir, dass Geld verwendet wurde, um Beziehungsnetze zu schaffen und den Charakter dieser Beziehungen zu symbolisieren. Die Schlüsselstrategie der Händler beim Austausch von materiellen Werten in verschiedenen Formen (u. a. Vieh, Münzen, Perlen, Kaurischnecken, Textilien und sogar menschliches Blut) war die Erzeugung sozialer Netzwerke.

In diesem Aufsatz kombinieren wir archäologische und ethnographische Zeugnisse des vorkolonialen Handels mit einem konzeptuellen Rahmen mannigfaltiger Geldformen als relationale Zahlungen. Nach einer Einführung in das Umfeld und die Zeugnisse des präkolonialen Ostafrika beschreiben wir Geld theoretisch: als Zahlungsmittel, seine Vielfalt und seine soziale Bedeutung. Durch den Blick auf die Handelsstrategien und auf geldähnliche Materialien und Objekte resituieren wir eurozentrische Darstellungen der Geldgeschichte und zeigen die Rolle von Händlern bei der Gestaltung sozialer Netzwerke und relationaler Einflussphären in Ostafrika auf.

Introduction

Money objects in archaeological sites are key artifact types, but their interpretation has often been highly specialised. For example, the study of coinage has been undertaken from the field of numismatics and seen chiefly as a means of providing information about – chronology and political succession (FLEISHER/WYNNE-JONES 2012). Archaeologists have tended to interpret money objects such as coins, primarily as evidence of market and trade activity: “coins have long served as a proxy for commercial exchange” (FLEISHER/WYNNE-JONES 2012, 19).

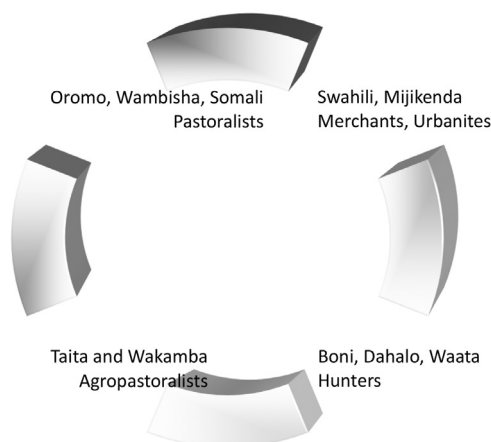
Money may be profitably viewed not just in the narrow commercial sense of a means of exchange. Rather money has varied other functions including a measure of value, unit of account, means of payment, or store of value (GIBB 1929, 243; JOHNSON 1970, 19). From this broader perspective, multiple forms of money used in East Africa included, amongst others, livestock, glass beads, cowries, textiles and ivory (Fig. 1, 3, 5, 7-9) (PALAVER 2009, 25). Understanding these monies, their diverse spheres of operation in time and space, and the ability to compare and exchange their value with an eye towards social or economic gain were important strategies of traders in the interaction spheres of the East African Coast.

We provocatively suggest using money as a means of payment, especially social payments across diverse social networks, may have been one of merchants’ most important trade strategies, especially in stitching together their networks of trust in the context of relatively weak political control of the highly ethnically diverse mosaics and hinterland regions (Fig. 2) (KUSIMBA/KUSIMBA 2005; 2018). We suggest that for East African merchants, money as payment was a primary strategy of creating networks and relationships (ZELIZER 2005; MAURER 2012) with trading partners and hinterland communities from which they sourced trade goods. Money as a means of creating relationships also took on important cultural and social meanings, often through use in highly ritualised contexts. Sometimes merchants even employed their own blood as such a medium through rituals of blood brotherhood (EVANS-PRITCHARD 1933, 369; HOCART 1935, 113-115). Through this analysis we hope to show that archaeologists’ focus on money as means of exchange has left underexplored its functions as vehicles of symbolic and cultural value, which were key to merchant strategies in building social networks and shaping the character of relationships. We combine insights offered by archaeological and ethnohistorical research in East Africa to model how trading specialists respond to their socio-political contexts and thus shape trading infrastructures (*e. g.* MIDDLETON 2004).

► Fig. 1. Cut ivory currency recovered from a Chief’s House in Kasigau.



► Fig. 2. Interaction spheres of the people of East Africa and interior were based on inherited trade partnerships.



The Swahili: An African mercantile society

Before we return to the argument and examples of money as social payment, we will set the stage on the East African Coast, a diverse and cosmopolitan mosaic of interacting ethnic groups (HORTON *et al.* 1986; LAMBEK 2001; KUSIMBA/KUSIMBA 2005; LAVIOLETTE 2008; FLEISHER/WYNNE-JONES 2010; 2012). The Coastal Swahili lived along 3,000 km of coastline (WRIGHT/RAKOTOARISOA 1990; WRIGHT 2007; LAVIOLETTE/WYNNE-JONES 2018). The Swahili speak a Bantu language (NURSE/SPEAR 1985; HINNEBUSCH/NURSE 1993). Their urban-centredness, a literary tradition, Afro-Islamic practice, and a diverse terrestrial and aquatic economy is nearly two millennia old, making them, like the Yoruba of Nigeria, among the most urbanised of African societies (MABOGUNJE 1962; KUSIMBA 2008; KUSIMBA/WALZ 2018).

Swahili urbanism has been a rich research topic. Capital flows beginning in Asia during the Sassanian Empire (AD 224-651) and Tang-Song Dynasty (AD 618-1279) incorporated many regions, including Eastern Africa, into early global trade (KUSIMBA 2017; 2018a; 2018b; LANE 2017; BEAUJARD 2018; 2019; OKA 2018; WALZ 2018). The emergence of urbanism in much of sub-Saharan Africa with the attendant evolution of leader-

ship and tolerance for inequality is closely allied to the continent's engagement in regional and inter-regional exchange networks that supported complex chiefly and state enterprises (WRIGHT 1993; OGUNDIRAN 2002; 2012; PWITI 2005; PIKIRAYI/CHIRIKURE 2011; MONROE 2013; SINCLAIR 2018). Along the Eastern African Coast and in the Sahel of West Africa, expansion of networks occurred in tandem with elite conversion to Islam (INSOLL 2003, 20) such that, by the 16th century when Europeans began to make forays into Africa, Islam was the dominant religion of the coastal elite (KRESSE 2007; LEWIS 2017). Islam continues to synergise together with ancestral spirit worship, Christianity, Hinduism, among other religious affiliations (CAPLAN 1982, 34; ALPERS 1984, 68; GILES 1989).

In new depictions of the functions of Swahili towns (LAVIOLETTE/FLEISHER 2005, 341), stone towns either administered to functional centres and produced items for long-distance international exchange (KUSIMBA 2008; OKA 2008; KUSIMBA *et al.* 2013a; FLEISHER/WYNNE-JONES 2016; ZHAO/QIN 2018); or produced and marketed goods with relative independence (HORTON 1996; HORTON/MIDDLETON 2000; SINCLAIR/HÅKANSSON 2000); or emulated elite ritual and religious (Islamic) styles and goods to construct nodes of authority in relation to competing towns (WRIGHT 1993; KUSIMBA 1999b; FLEISHER 2010; 2013; WYNNE-JONES 2010). Each of these models has the potential to recognise and delineate the influence of non-coastal (and non-urban) groups, economies, and goods on Swahili political economies at multiple scales (KUSIMBA 2009; 2018a; 2018b; KUSIMBA *et al.* 2013a; 2017; for a summary see WALZ 2017). In effect, such models have helped to further challenge the simplified characterisations of the Swahili history as of external origin or as entirely indigenous (KUSIMBA 1999a; *cf.* PRADINES 2013).

Nevertheless, the urban and “maritime” reconstructions of Swahili identity have neglected to incorporate its richly entangled local roots, histories, and innovations. During their history, the Swahili have shared this coast with other Bantu- and Cushitic-speaking communities, with whom they have interacted through periods of peaceful coexistence as well as warfare and competition over the region's resources (*e.g.* ABUNGU 1990; WALZ 2010; KUSIMBA *et al.* 2013b). Their neighbours and partners include, for instance, the Somali, Oromo, Mijikenda, Akamba, Zigua, Zaramo, and Yao (*e.g.* ALPERS 1975; DUARTE 1993; WILLIS 1993; GONZALES 2009; GEARHARDT/GILES 2013; BEIDELMAN 2017). Over the years and until the mid-20th century, the coastal economy was diverse. The food-getting strategies incorporated foraging, fishing, agropastoralism, and farming (STILES 1981; WALSH 1990; TOSCO 1992; KASSAM/BASHUNA 2004). These complemen-

tary strategies enabled the development of highly complex intercommunity and regional social and economic networks we have previously described as mosaics (KUSIMBA/KUSIMBA 2005; 2018); trade and interactions served to preserve complementary differences and social boundaries (see also HERLEHY 1984; PARKIN 1989; 2006).

The various regions of East Africa – the hinterland, savannah, highlands, and great lakes – produced different kinds of foodstuffs: wood, iron and copper, elephant and hippopotamus ivory, hides and skins, and many other goods as part of the long-distance trade from Africa to Asia (MIDDLETON 2004, 9; KUSIMBA/KUSIMBA 2018; KUSIMBA/WALZ 2018). East African ivory was highly desirable due to its suitability for carving, being comparatively softer than West African and Indian ivory (BEACHEY 1967; PALAVER 2009, 20). Trade relationships developed and exploited ethnic and geographical diversity, resulting in an ethnic mosaic of complementary lifeways and trading systems. Trade and interaction served to preserve distinctive lifeways complementary with those of their neighbours; for example, farmers and pastoralists could pursue specialised lifeways and trade foodstuffs such as milk and grains with each other (KUSIMBA/KUSIMBA 2005). Creating and sustaining these mosaics was the result of creating relationships and was undertaken both through everyday interactions between neighbours and regular trade partners, and through ambitious extensions of trade to new areas.

Defining and recognizing money objects

The first issue with studying money archaeologically is identifying it. Archaeologists have tended to focus on money as a means of exchange. When attempting to define money, archaeologists have looked for attributes like durability, portability, divisibility, fungibility, and uniformity – and consequently focused on money objects such as coinage, metal, and cowrie shells. In truth, objects with a variety of characteristics were used as money in East Africa, especially when money is considered from its broader functions. The study of money and money objects cross-culturally has pointed to the varied functions and purposes of exchanged money, with diverse functions in payment, store of value, unit of account and measure of value point to more diverse meanings and uses of money; the long archaeological and material record of money points to a wide variety of money objects and their functions beyond state-issued currencies (MAURER 2006; 2012).

We suggest that the idea of money as payment is underutilised in archaeological interpretations of the history of exchange, and that the social dimensions and meanings of exchange are ever-present. Money may have had its origins in social



▲ *Fig. 3. Hoe currency such as this from Nigeria were widely popular for use as bride wealth money.*

payments, for example bridewealth or other ritual gifts (Fig. 3). As MAUSS (2009 [1914], 135) wrote in “The Origins of Money”, objects with spiritual power – which he catalogued from multiple accounts of precious stones, pearls, and other examples, “confer on their owner a power that is like purchasing power – that is prestige conferred on those who possess it and those who use it to command others.” The origins of money was thus its *mana* or spiritual authority, that was also associated with spiritual and political elites in a variety of cultures (MAUSS 2009 [1914]); 2016 [1923]; PARRY/BLOCH 1989; LAMBEK 2001). Marriage gifts were an exchange of this *mana* or spiritual authority that give the two sides an identity. Thereafter the two sides make perpetual gift exchange (which expresses) the intimacy and fear which arise from this creditor-debtor relationship.

Mauss went on to explain how money’s material nature becomes important when its objects acquire social value and meaning through a history of use, and when these values in turn influence social relationships and confer “powers” on their owners.

“Money ... is a standard of value, a use value that is not divisible but is permanent, transmissible, and although the object involved in the transactions and usages may deteriorate, the medium can acquire other values from usage and gift-giving that are fungible and transformational. ... the talisman and its ownership becomes equivalent, becoming an object desired by all but conferring on its owner a power readily transformed into purchasing power” (MAUSS 2009 [1914], 134).

From this perspective money is contextualised, and used to shape specific relationships, meanings, and moral judgments. For example, money can be variously described as a gift, a fine, or a bribe – and these define the moral dimensions of the underlying relationships these social monies create or express (ZELIZER 2005; 2017). It also

defines the temporal and historical context and the memory of these relationships (HART 2001; LAMBEK 2001). Money as payment confers meanings and social identities around creditor/debtor onto the partners involved; money and objects used as money are “media” (ZELIZER 2005, 35) that mark and give character to the relationships the exchange created. In this paper, we will also be examining how rituals give meaning to exchanges and identity to the partners involved. Finally, in addition to where value comes from and what it means, there is also “the act and the infrastructure” of value transfer – how different forms and functions of money relate to each other and how value may be derived or levied from their exchange by varied actors (MAURER 2012).

Merchant strategies

This productive focus has shed light on the multiplicities of money in African history; on who is exchanging varied forms of value with whom and the networks and social infrastructures that emerge. Merchant strategies on the East African Coast involved multiple kinds of money and marshalled the numerous functions of money (PALAVER 2009, 26; GUYER/PALAVER 2018, 2). Furthermore, merchant strategies involved far more than simply injecting means of exchange into local economies. To plan and execute their journeys, calculate costs and profits, and assess and compare forms of value, traders relied directly on the technologies and infrastructures of trade, including accounting; bulk transport and containers; commodities and weights; and currencies. We consider one of these technologies, currency and money infrastructure, and its role in trade networks related to the precolonial states of the East African Coast (Fig. 4). Some of these monies were locally produced, and others imported. Some were state-produced currencies, and other monies were generated by the variety of local economies enmeshed in trade with merchants and others (*e. g.* JOHNSON 1968a; LOVEJOY 1974, 563). Negotiating with multiple forms of money and value and across overlapping spatial and temporal boundaries was an important strategy employed by traders (PALAVER 2009, 26; GUYER/PALAVER 2018, 2). Elites in coastal Swahili polities depended on their hinterlands for trade items intended for Indian Ocean partners, such as ivory and cat skins. However, they had little political control over hinterlands, so they depended on merchants as crucial intermediaries of the exchange network (BEACHEY 1967, 277; MIDDLETON 2004, 88).

As GUYER/PALAVER (2018, 3) write:

“In Africa, over centuries of long-distance trade, the regional markets and local culturally based social transactions were mediated through many value-calculable objects: some imported through



Fig. 4. Map of Eastern Africa showing early sites that have yielded evidence for long-distance trade.

trade and others produced by local artisans. The management of what we would now refer to as “exchange rates” between systems, such as across cultural borders along commodity-specific net-

works, was generally localised to particular frontiers, at the interface of different economic and value systems.”

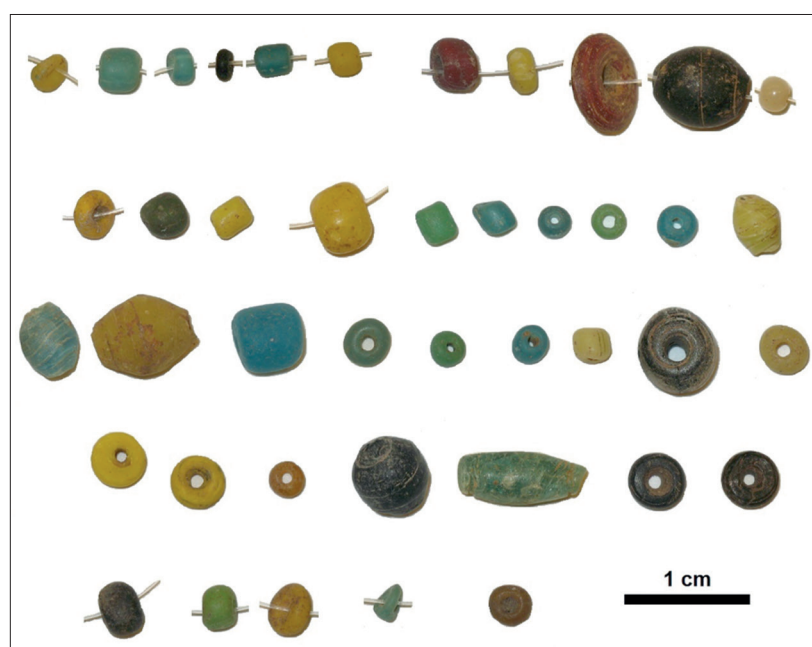
► Fig. 5. *Cypraea annulus* from Manda was widely circulated as currency in the interior of Africa, from East Africa to West Africa.



► Fig. 6. *Cypraea moneta* from the Maldives Islands were used in the purchase of many products in the interior, including the enslaved.



▼ Fig. 7. The popularity of glass beads with all people, from hunter gatherers to the elite, points to the important role glass beads played as a means of payment, exchange, and currency. The portability, durability, changeability of these beads made them universally acceptable as standard currency (L. Dussubieux, *The Field Museum*).



from the Zanzibar and Lamu archipelago (Fig. 5-6) (JOHNSON 1968b, 17). The importance of cowries to West Africa was noted in the 14th century by the North African globetrotter Ibn Batuta who described the lucrative trade in the widely popular Maldivian cowrie shells in the following terms (LOVEJOY 1974, 564):

“They sell them in exchange for rice to the people of Bengal, who also use them as money, as well as to the Yementes, who use them instead of sand [as ballast] in their ships. These shells were used also by the negroes in their lands. I saw them being sold at Mali and Gawgaw at the rate of 1150 for a gold dinar (GIBB 1929, 243; cited in JOHNSON 1968b, 19). As early as the sixteenth century Benin was using [Maldivian] cowries as its currency, and by the following century the neighbouring Yoruba states and probably the lower Niger Valley had adopted the system.”

Cowries were used in the purchase of many products in the interior, including the enslaved (HOGENDORN/JOHNSON 1986; GUYER/PALAUER 2018, 8). Thus, complex systems of assigning and reckoning value co-existed (PALAUER 2009, 26). In East Africa, as one moved across the landscape and different societies from forager, pastoral, and agrarian, money objects were varied and responsive to participants' needs (ROBERTSON 1997). Intercommunity and interregional trade was an extremely complex affair. Exchange rates varied according to taste, demand, and need. Glass beads were popular with all people from hunter gatherers to the elite, this illustrates the important role glass beads played as a means of payment, exchange, and currency (HARDING 1962). The portability, durability, and ease of exchange of these beads made them universally acceptable as a standard currency (Fig. 7). As GUYER/PALAUER (2018, 9) write:

“Beads, as opposed to cloth, could be split up into small units, and they became the most widespread means of buying food during caravan journeys. In the markets of the main commercial towns of the interior, such as Msene, Tabora, and Ujiji, a standard currency in beads was adopted in the second part of the 19th century. The rate of exchange was based on a cloth standard, and beads became an interface currency that allowed traders of different origin to meet and exchange their goods.”

Media of exchange and the coast and in the interior

Example 1: Buganda

Not all money objects are used as media of exchange. Money as a method of payment has a much longer history in this region, where money objects such as cattle, goats, salt, hoes, and bar cloth were forms of money with characteristics

different to beads. For example, cattle grow and reproduce just like people. In the Great Lakes region kingdom of Buganda where it is likely that the first item to function as currency was barkcloth, people generally exchanged goods in non-monetary transactions, but barkcloth was used to price highly valued items such as hoes, goats, or cattle. Tributes to the Buganda king, the *kabaka*, were also paid in barkcloth, which was specifically made for this purpose and, together with other products like beer or fowl, was part of marriage payments. GUYER/PALAUER (2018) show that *ensinda* beads came into circulation in the second half of the 18th century and became used as currency. The *kabaka* had a monopoly on the circulation of *ensinda*, which were used for trade purposes as well as to pay taxes to the king. The *ensinda* were themselves eventually supplanted in the 19th century, by ivory pieces, which when bored with a central hole were arranged on palm fibre strings. They too were controlled by the *kabaka*. Other monies of the 19th century included cowries and imported cloth. In precolonial Buganda, cowries were bored and put on strings of 100 shells called *kiasa*. This could be divided into halves of 50 each, and again into five parts of ten each, the smallest division being five shells. This made cowries particularly suitable to buying goods of very small value, like foodstuffs, and at the same time allowed for the creation of larger-currency denominations.

Example 2: Swahili coinage

The Axumite Kingdom struck its own coins from the 3rd until the 8th century CE. In the 8th century CE, the Swahili sultanates of the East African Coast also started to mint their own coins, such as copper coins produced in the town of Kilwa (CHITTICK 1974; FLEISHER/WYNNE-JONES 2012). The circulation of Kilwa copper coins was limited, and they seem to not have filtered into Indian Ocean markets in significant quantities. They were just one of the many standards of value that circulated in this mosaic. Kilwa's copper coins included Koranic verses chosen to rhyme with a ruler's name and thus honour him, and the coins of multiple rulers circulated concomitantly. Just three gold coins survive from what was minted at Kilwa, and silver coins from Shanga, Pemba and Kilwa are also rare (HORTON 1996). Beads may also have been used as Swahili coins were part of a complex monetary system characterised by the simultaneous circulation and acceptance of commodity currencies, such as beads, cloth, and grains. Minting on the Swahili Coast lasted until the 15th century, when the arrival of European traders promoted the use of international coins, such as Spanish piasters and Maria Theresa thalers. Locally minted small-denomination coins circulated in some towns along the coast, such as in Mombasa and Lamu. However, local currencies such as sorghum continued to be used. Swahili kings mint-

ed their own coins in gold, silver and copper. The various coins were equal in value to those issued elsewhere in the Indian Ocean world by Egyptian, Arab, Portuguese and other rulers (MIDDLETON 2004, 84). In the 19th century, the medium of exchange was primarily Indian currency issued in Bombay.

Other currencies: Beads and brass wires

Along the central caravan road, brass wire was particularly valued in Unyamwezi. There it was used to produce coil-bracelets, which were also in demand in the market of Ujiji, where they were used to buy slaves and ivory. In Ugogo, brass and copper wires were widely requested as hongo and then used to make ornaments (Fig. 8-9) (PALAUER 2009, 22).

During caravan journeys glass beads were used to discharge different types of obligations: to pay taxes along the roads, to pay the caravan personnel and to buy different types of goods, such as foodstuffs and, in some regions, the goods of the long-distance trade. They were used to compensate the caravan personnel (VAN DER SLEEN 1958, 211-212; BEACHEY 1967; PALAUER 2009, 23).



◀ Fig. 8. Brass rights were widely circulated as currency in precolonial Africa and also served as currency for bride wealth.



◀ Fig. 9. Brass and copper bracelets and wires were widely used as money for purchase of slaves, ivory, and as bride wealth.

Trade and social relationships: Merchant strategies in the interior

In our studies of the Tsavo region, we used ethnohistorical information to bring these hinterland communities to life. The hinterland was ecologically diverse, including the dry Taru Desert inhabited by Waata hunters and gatherers, and Orma pastoralists, and the well-watered Taita Hills and Ukambani plateau populated by Taita, and Akamba farmers, herders, hunters, and traders (KUSIMBA, S. 2003). In 2005 we recorded interviews with elders who expanded the players on this stage of the ethnic mosaic. They told us that the Waata were peripatetic foragers; the Saghala agriculturalists of the terraced uplands of the Taita Hills; the Wanyama agropastoralists, and the Oromo pastoralists. The Saghala also speak of the Wambisha pastoralists, whom the Saghala assimilated upon their arrival in the Taita Hills in the 16th century. These communities created relationships of exchange and interaction that intertwined them, but nevertheless also preserved ethnic boundaries (BARTH 1969; KUSIMBA/KUSIMBA 2005; 2018).

The ethnographic data gleaned from these interviews bolster the notion that interregional exchange and long-distance trade networks precipitated the rise of urbanism. As argued by CURTIN (1975), emergent, complex chiefdoms and states across diverse landscapes sustained their political economies through trade. Archaeological excavations at coastal urban settlements have revealed an evolutionary trajectory showing that “as they became more urbane, the residents of cities took up specialised vocations, such as metalworking, bead making, weaving, and pottery making” (KUSIMBA/WALZ 2018, 433). Goods produced from home including cloth, marine and ostrich eggshell beads, iron, gold and copper smithing, and marine delicacies that were highly desirable inland, such as salted, dried and smoked fish were widely distributed in the interior. By the 12th century the coast and interior had become a truly networked political economy that connected hunters who supplied ivory, honey, beeswax, ostrich eggs, animal skins, poison, incense, and medicines, to farmers who supplied rice, millet, and cowpeas, to pastoralists who supplied milk, butter, yoghurt, and leather, to coastal people, some urban and others rural, who supplied products like fish, marine shells, finished iron tools, cloth, and glass beads, among other items (KUSIMBA/WALZ 2018, 433).

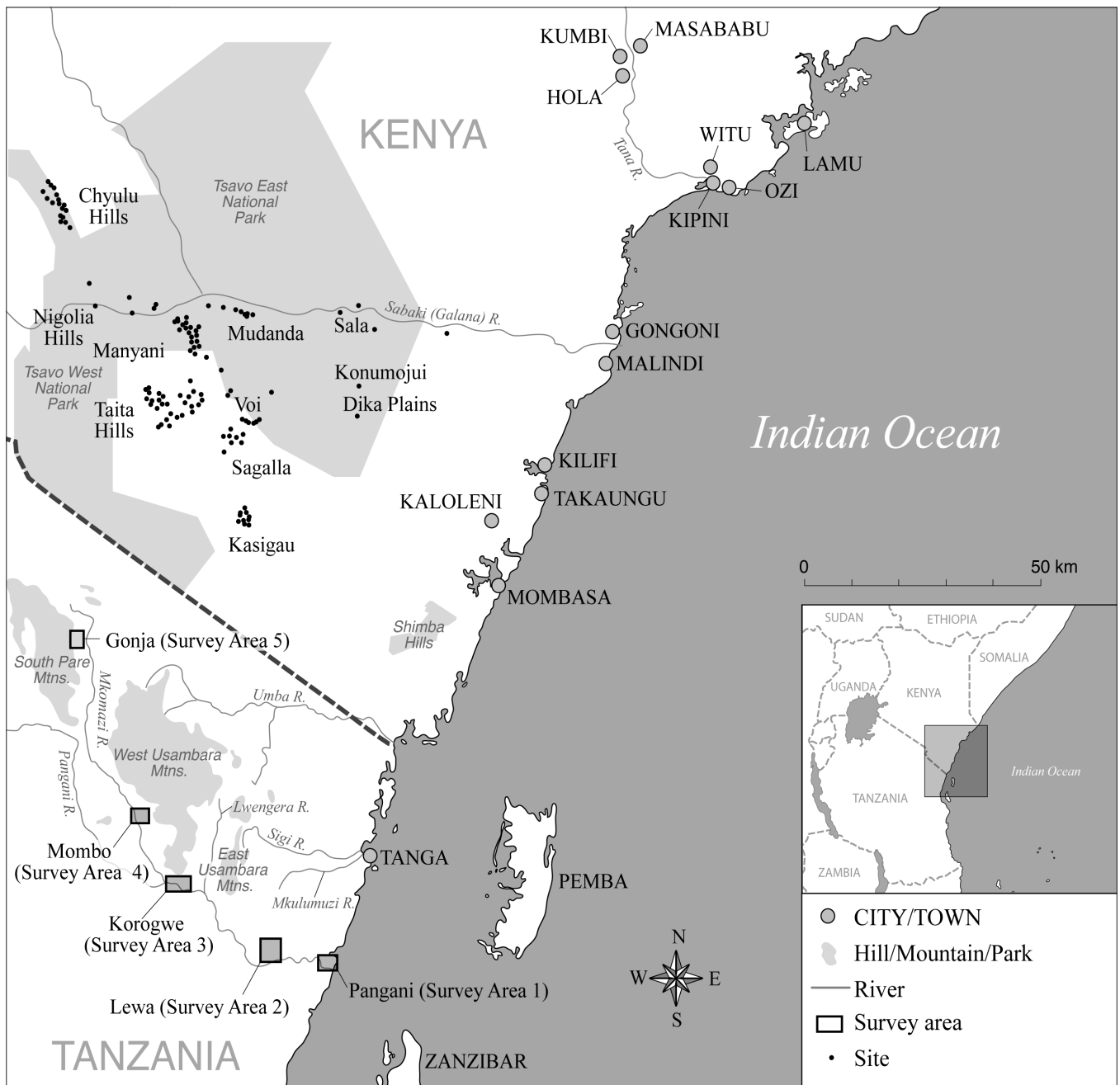
We proposed the idea of socioeconomic mosaics as a useful model for understanding the Swahili world and wider Eastern Africa because it theorised ethnic diversity as a landscape of co-operatively interacting social units, each maintaining a distinct identity but engaging with other social units (KUSIMBA/KUSIMBA 2005; 2018; KUSIMBA *et al.* 2013a). The idea of mosaic allows us to evaluate how non-related people who inhabit ecological niches with different but complementary resources

might develop and sustain norms of cooperation without resorting to political coercion. How did 12th century East Africans build exchange networks that have left no visible infrastructure such as roads and accounting? How did they successfully maintain their social boundaries even as they engaged in regional and international trade, and moved across these social boundaries, sometimes with ease until the advent of colonisation and climate change in the 16th century? The archaeological assemblage on the coast and in the interior portrayed African merchants as actors who built and sustained local and regional networks that were shaped by multiple spheres of interaction, oral traditions and historical accounts of the peoples own conceptions of their history (ABDULAZIZ 1979; BAKARI/ALLEN 1981; HERLEHY 1984; MAZRUI/SHARIFF 1994; MAZRUI 1998).

Archaeological surveys and excavations at multiple sites on the coast and mainland Southeast Kenya and Northeast Tanzania reveal a complex history of land use and interaction across the coastal and inland areas (Fig. 10) (*e.g.* KUSIMBA *et al.* 2005; WALZ 2010; 2013; 2017). The established chronological history documents a landscape inhabited by diverse communities who pursued complementary strategies of surviving and thriving. Daily life in inland Southeast Kenya and Northeast Tanzania was characterised by complementary, co-operative strategies between interactive partners across a vast landscape where resources were dispersed. Social interactions were maintained through a series of economic, ritual, affinal, kinship, and other ties (KUSIMBA/WALZ 2018, 434). A combined 700 diverse archaeological sites including, hunter-gatherer, swidden farmers, nomadic pastoralists, and sedentary agropastoralists in Southeast Kenya and Northeast Tanzania reveal complex use of highly integrative and innovative strategies of resource use and sharing. Cooperation among diverse communities was the *modus operandi* for making a living in a landscape characterised by dispersed resources (among other factors). We briefly discuss two examples to reinforce this concept.

Example 1: The Tsavo Mosaic

Regional archaeology combined with ethnographic research in Tsavo National Park has recovered over 350 archaeological sites, a sample of 15 sites which were excavated across diverse ecological zones (see Tab. 1; Fig. 10) (KUSIMBA *et al.* 2005; 2013b; Wright, D. 2005). Based on excavations, cattle (*Bos Taurus*) were introduced in coastal Southeast Kenya 3870 BP (WRIGHT, D. 2005). Coastal marine shell beads arrived inland at about 3000 CE. Between *ca.* 500 CE-1000 CE, the region of Southeast Kenya underwent rapid demographic growth in tandem with investment in rice and millet farming, iron smelting, salt making, and elephant hunting (KUSIMBA 2009; KUSIMBA *et al.* 2005). Simultaneously, the volume of marine arti-



facts increased, pointing to an intensification of inland-coastal interactions. During the late Iron Age (*ca.* 1000 CE-1500 CE) diverse settlement patterns, including large and complex villages emerged in the hinterland as elite coastal residents began to invest in more permanent residences built of coral rag. At Kasigau, some entrepreneurial residents began pen-feeding their cattle, perhaps to increase milk yield and meat quality (KUSIMBA 2009). Others began terrace farming similar to that later employed at Engaruka (SUTTON 1998).

At Ngulia Hills, 150 km away, rice and millet farming intensified. Innovations in hunting, including the use of poison by specialised hunters – Waata, Dahalo, Degere, and other coastal foragers – points to an increased demand for ivory at the coast (STILES 1981; WALSH 1990; TOSCO 1992;

KASSAM/BASHUNA 2004). During this time, inland goods from Tsavo were traded to the coast and included cut ivory, bloom, and unworked ostrich egg shells (THORBAHN 1979; KUSIMBA *et al.* 2005). Marine shell and glass beads moved in the opposite direction into the hinterland. These finds show that the rise of urban polities on the coast is accompanied by similar developments inland, including investment in (1) irrigation and terraced agriculture, (2) iron production, and (3) trade in ivory and other highly desirable animal products. By any measure, this is a symbiotic relationship between communities in the coast and hinterland, not an asymmetric one dominated by any place.

Examining the key products exchanged between the coast and interior, we found that

▲ Fig. 10. Map of the East African Coast and hinterland (J. Seagard, *The Field Museum*).

products of strictly coastal origin made up 25 % of all products found on coastal sites. About half of the different types of products exported in Indian Ocean trade came from inland. In other words, wealth accumulations by the emergent coastal elite depended on its complement, on strategies for increased and intensified terrestrial production and orientation (KUSIMBA/WALZ 2018, 433). The interconnectedness and interdependence on multiple sources for household, regional and transoceanic needs suggest that the origins and sustenance of Swahili polities lay in the social networks they also built and maintained with inland communities. These networks persist today. The sustenance of these ties depended on the monetary systems of exchange that interacting partners sustained. Merchant and trading strategies were situational and shifted in response to the negotiations between traders, foreign merchants, and local actors.

Example 2: Northeast Tanzania

Northeast Tanzania's unique geography and mosaic botanical environment (Fig. 10) fostered symbiotic and competitive relations among diverse but interdependent communities (WALZ 2010). The systematic archaeological survey of a corridor 200 km inland from Pangani documented 337 sites that span from the Early Stone Age to recent times. Finds from excavations yielded enormous data for regional exchange through time up to the present. The record revealed livelihoods characterised by production, exchange, and consumption of goods from a shared landscape. Like our work in the Tsavo mosaic, Jonathan Walz's research revealed that inland peoples in Northeast Tanzania were more integrally connected with other regions and the coast than previously thought (WALZ 2005; 2010; 2013).

For example, systematic excavations at Kwa Mgogo (650-1350 CE) yielded more than 500 kg of TIW-TT and Group B ceramics, more than 10 kg of faunal remains, and more than 30 stone querns employed in food processing. Most of the 600 objects of personal adornment retrieved at Kwa Mgogo were made from *Lissachatina* spp.: the Giant African land snail. All stages of shell bead production are evident, and preliminarily indicate production for local use and wider regional exchange. Coastal finds included 60 marine shells, multiple aragonite (fossilized giant clam shell) beads, 16 worked tubes of marine shell, and other non-local objects. The production and timed transition from land snail shell discs to marine shell tubes parallels a contemporaneous trend at coastal sites, like Shanga and Manda in Kenya (HORTON 1996). Other artifacts, of foreign origin, include 34 glass beads and beads of semi-precious stone (*e. g.* rock crystal, carnelian, and agate). The elemental signatures of 11 glass beads indicate Zhizo Series glass (8th-10th century CE) from Iran or Iraq,

and later beads (post-1000 CE) of Indo-Pacific varieties made at localities in South Asia (WALZ 2010). Specimens of hatched sgraffiato ware (of Middle East origin) and coastal Swahili ceramics also were recovered, including red burnished and graphited feasting bowls typical of Swahili settlements during the middle 2nd millennium. In addition, the team recovered wound glass beads from post-1250 CE contexts, shaped gneiss blocks, modified pieces of graphite and bone, and implements of copper and iron (WALZ 2013). Based on these sites and materials, among other finds, inland African and Swahili coastal communities remained commercially entangled from earlier times and through the middle 2nd millennium.

At Gonja, sites associated with Group B and Maore ceramics extend in a clustered distribution along the skirt of mountains (WALZ 2010). Surface and excavated finds from these localities show a spike in iron production and the manufacture of land snail shell beads that align chronologically with the growth of coastal communities and the emergence of Swahili urban localities along the coast, for example at Tongoni (in Northeast Tanzania), during the late 1st millennium to the middle 2nd millennium CE. Pieces of rock crystal and a small number of Indo-Pacific glass beads and shards of glass typical at Swahili urban sites indicate more far-flung ties at the height of Swahili urbanism during the early to middle 2nd millennium CE (WALZ 2010). Beads recovered at Gonja Maore and Kwa Mgogo constitute a portion of the 195 bead types generated from the overall project: 149 of imported glass and 46 of other materials.

Extractive activities involving iron smelting sites characterise some of the archaeological localities in the Gonja area, which all date to *ca.* 900-1350 CE and perhaps later, a period of population growth along the coast of Southeast Kenya and Northeast Tanzania (KUSIMBA 1999a; HELM 2004; WALZ 2010). Residents smelted iron to meet needs beyond their own, putatively for coastal consumers, as noted earlier. This interpretation of the Gonja area considers the near absence of finished iron artifacts recovered, the limited nature of contemporaneous iron production at Swahili coastal settlements (MAPUNDA 2002), like Tongoni, and substantial direct evidence of coast-inland entanglement. Exchange with societies of different life-ways in the broader region, including hunter-gatherers, apparently served local people well up to and through the Portuguese and Omani incursions, even though those influences eventually contributed to the decline of Swahili stone towns (EHRET 2001; EKBLOM 2008; OKA 2008).

Later, in Southeast Kenya and Northeast Tanzania, communities like the Kamba took on a new and significant role as middlemen in the burgeoning slave and ivory trade. Communities of mixed subsistence farmers, like the Pare and Zigua, com-

peted for access to the flow in new types of goods as chiefdoms and kingdoms vied for power and the control of people and products during a period of increasing uncertainty (*e. g.* ROBERTSON 1997; HÅKANSSON 1998). During this timeframe, defined routes emerged as characteristic, rather than exceptional, in wider Eastern Africa, evidence for which is clear in the later documents and oral traditions of the region (*e. g.* GIBLIN 1992). North-east Tanzania's ancient inland corridor shows that patterned entanglement was not born in the last few centuries, although late 18th century entanglement may have taken an even more defined and regularised form driven by imperialism, capitalism, and the increased exploitation of vulnerable people and dispersed resources (COOPER 1981; CROUCHER 2006; ROCKEL 2006).

Swahili merchants, goods, markets, and currency

The Swahili were merchants in international trade for many centuries. They are still merchants and cultural brokers between the interior of Africa and the northern and eastern shores of the Indian Ocean. Their roles as long-distance trade middlemen were important parts of Swahili society and civilisation (MIDDLETON 2004, 4). Different types of trade co-existed together with the use of different types of currencies (PALAVER 2009, 26). Along the many caravan roads that intersected in the interior, goods coming from African inter-regional trade and those of foreign origin carried from the coast were exchanged in the framework of a complex monetary system, where different types of currencies responded to the needs of trade and where the bargaining was based on the assortment of different types of goods. But money also continued to be a method of payment both as tribute and bride wealth.

Glass beads and marine shells, primarily conus, cowrie – *Cypraea annulus* – and *Polynices mamilla* were widely circulated in Africa and provide the best evidence of long-distance exchange between the coast and the interior (FAGAN 1966, 93). Glass beads were used for the adornment of important individuals and disseminated in small numbers into regional trading networks. Marine shells including cowrie found in the lowest levels of two Early Iron Age mounds on the Batoka plateau and at the base of the Kalundu mound is dated to AD 455 ± 95 (SR-123), two others from Gundu mound near Batoka itself date to AD 440 ± 85 (GX-1114) (FAGAN 1969, 9) and point to trade between the coast and central emergent chiefdoms in Central Africa.

Gold, ivory, copper, and iron were the main trade items destined for the coast. Evidence for the antiquity of gold mining and restricted access for the elite has been recovered in the early cen-

turies of the Iron Age. Found mostly in contexts where long-distance trade was important gold, like copper, was used as a monetary unit of fixed value (FAGAN 1969, 11). The successive masters of the East Coast trade used local trading networks as a starting point for their trade, stimulating demands for raw materials. The result was economic and political change, and the development of sophisticated centres of metallurgical and commercial activity in the far interior, reflected in such finds from sites such as Sanga and Ingombe (NENQUIN 1967).

The presence of coastal products into the interior heartland of Central Africa points to a long tradition of long-distance travel for trade and friendship. In East Africa, the Nyamwezi, Giriama, and Akamba had built a strong reputation as major caravan traders whose economic engagement connected the coast with the hinterland. For example, the Nyamwezi, interregional trade networks extended beyond Lake Tanganyika on the west, Lake Victoria on the north and the southern regions of Ufipa and Ruemba (ROBERTS 1970). They monopolised regional trade in copper, tobacco and its by-products, iron and salt and constituted the largest East Africa trading diaspora in the Katanga copper region in the mid 19th century (THOMSON 1968, 46; PALAVER 2009, 21).

In the main markets of the interior these different types of currencies were looked at in relation to one another and this led to the need for a recognised exchange rate. Glass beads linked the different currencies used along the caravan roads. Throughout the 19th century this commodity was highly requested along the caravan roads as a means of payment and exchange, but also in the main markets of the interior, where glass beads were the recognised currency.

Cloth, glass beads and metal wire were the main medium of exchange in the market economy of the interior of 19th-century East Africa, but glass beads were used to pay for ivory and slaves. Desire for glass beads coming from the East African market linked this area to the main centres of production of glass beads in Europe, like Venice. There, the production had to adapt itself to the fluctuations in demand coming from abroad. Tracing the paths followed by Venetian glass beads in the 19th century allow us to link the history of Africa to the history of Europe, studying not only the consequences of European economic expansion and production on marginal economies, but travelling, 'that same road in the opposite direction, to see what light Africa's experience can cast on European history (FENOALTEA 1999, 145) (Tab. 1).

Services offered at Port Towns or Caravanserais

A town had to provide water, food, recreation, hospitality, places of worship of many creeds, and

Goods traded from Africa to Asia	Goods traded from Asia to Africa
Ivory (elephant and hippopotamus)	Cloth (silk, cotton, wool)
Gold	Beads
Slaves	Porcelain
Mangrove timber	Rice
Grains	Spices (pepper, cinnamon, nutmeg, mace)
Beeswax	Paper
Turtle shell	Ink
Rhinoceros horn	Tea
Hide and skins	Wine
Ambergris	Sacred and other books
Palm leaves (roofing)	Kohl and other cosmetics
Cowrie shells	Fragrance (sandalwood and aloe)
Sisal	
Rubber	
Sugar	

▲ *Tab. 1. Commodities of Trade.*

personal security. Local agents put together crews, sellers, and buyers, gave them financial security to make deals, to find forms of credit, to provide safe storage, and the means for enforcing contracts (MIDDLETON 2004, 79).

They also coordinated the arrival and departure of the ships on the ocean trade and of caravans that carried trade commodities landward. While ocean ships depended on the monsoons, caravans had to avoid the height of both the dry and wet seasons of the African interior. They depended on fins shelter, food, and water, as well as protection from marauders, along the caravan routes (MIDDLETON 2004, 82).

African traders who carried their iron hoes, tobacco, salt and agricultural products to the markets or to the caravanserais exchanged their goods for a commodity that could be used as a means of payment in their place of origin. Since the goods available in the towns of the interior and along the caravan roads came from different areas of production, in which different kinds of glass beads were used as a means of payment, European travelers found that a particular product could be purchased only with certain kinds of beads (PALAVER 2009, 25-26).

Merchants and brokers: Relationships

Merchants on the East African coast built up networks of resources to ensure regular supply of goods for their partners, set prices, meet demands, and ensure safe passage. They sought to jealously protect their intermediary, or brokerage, role by minimising direct contact between interior and oceans traders (MIDDLETON 2004, 82). Transfer or value transfer was a key means to produce relationships of trust (MIDDLETON 2004, 83). Relationships were based upon intimate ties of kinship, friendship, rank, and trust (MIDDLETON 2004, 88). Resources exchange was especially key for affinal kin. These exchanges took place within

the domestic sphere of the merchants' houses, places of security that non family members could not enter unless invited. They were places where open dispute and arguments were forbidden (MIDDLETON 2004, 83). Piety, charity, and religious faith and trust were the cornerstone of these transactions (MIDDLETON 2004, 88). The affinal nature of these transactions minimised exploitation as they were the business of in-laws and the beneficiaries were usually members of ones lineage (Tab. 2).

Gift exchange enabled the Swahili merchants and brokers to manipulate the system of status on both the coast and inland. It was a complex system of building wide-scale and long-term heritable relationships that connected Asia and Africa (MIDDLETON 2004, 86).

Merchant relationships: Blood brotherhoods

At the boundaries of social groups, merchants did important work organising and valuing relationships using assorted material types of money in the broadest sense. One of the most important ways that merchants created relationships and pledged trust and fidelity was through creating blood brotherhoods. In a blood brotherhood ritual, men would create relationships through a ritualised pact around trust and reciprocity. This ritual was exceedingly common across East Africa during the historical period, as originally noted by EVANS-PRITCHARD (1933). These rituals were of several different types and involved a pact of mutual assistance which involved two participants' ingesting each other's blood. Among the Zande the life-long pact would allow blood brothers the assurance of mutual assistance and alliance against common enemies. Supernatural sanction would curse anyone who hurt his blood brother. Evans-Pritchard reports a variety of rituals involving cutting the chest or hand and soaking a piece of wood or groundnut in the blood before eating.

WHITE (1994) has also reviewed similar classic studies and argued that the blood brotherhood ritual allowed men to create idealised relationships with each other outside those already recognised by consanguineal kinship or marriage, or forms of friendship with intimates. The blood brotherhood was thus a novel ritualised form – it allowed men who had little in common to form pacts of intimacy and reciprocity using the symbolic intimacy of shared bodily fluids. The ritual of blood brotherhood is an extension of the idea of payment relations, a form of exchange that produces specific relationships and meanings.

However the ritual was also extremely common among travellers and traders who ventured beyond the boundaries of Zandeland to trade or seek out reciprocal relationships during periods of hunger, drought, or just to trade – and was known in many parts of East Africa among merchants and traders,

for whom its rituals and rites of intimacy became somewhat attenuated; rather it became more a form of alliance building rather than an intimate bond (see WHITE 1994). Travellers would seek out a local blood brother and rely on him for assistance and safe passage, and for permissions from local chiefs to camp and to trade.

Among the Tatsimo of Madagascar, cloth is important for sealing the pact of blood brotherhood called *atibena*. One week after the initial *atibena* ceremony, the two individuals united by it exchange personal cloths. This exchange is accompanied by a telling of the histories, *tantara*, of the respective family ancestors. The two actions combine to cement the relationship – both materially and historically – and create a new kinship tie that is meant to endure for generations. Each piece of cloth symbolises the individual that offers it, while the exchange of the cloths symbolises the new closeness of their social relationship (KUSIMBA 2004).

In the hinterlands of the Swahili Coast in the Tsavo region, blood brotherhood, or *undugu wa chale*, was the primary means through which people forged relationships with each other (HERLEHY 1984, 293–294; PRESTHOLDT 2004). Walyankuru who lived in the Tsavo region and were among the first residents of the region were revered hunters. They were the butchers of the region and suppliers of most of the meat consumed in the region. Known for their excellent hunting and tracking skills, Walyankuru monopolised the supply of meat which they exchanged for grains, including cowpeas, millet, and sorghum before the introduction of maize.

In respect of the relationships Ariangulo foragers had with other Tsavo communities, the elders of the region told us that blood brotherhoods were the means through which Kenyans formalised trade relationships and maintained networks of alliances. Taita, Duruma, and Akamba elders in Kasigau, Kajire, and Maungu unanimously agreed that Ariangulo were the undisputed “kings” of the Tsavo region. They were famous for their knowledge of the Tsavo wilderness, their leadership in hunting and tracking skills and their knowledge of a wide variety of medicine, chief among them, that of making poison. All the local communities relied on the Ariangulo and sought them for trade, exchange, and cooperation in many areas but especially in the procurement of ivory, honey and beeswax, leopard and lion skins, the rhino horn and other trophies in high demand for local, regional, and extra-regional markets.

The Taita villages were linked by a complex system of paths. These paths often led to market centres where local residents met regularly on a rotational basis to exchange agricultural products, game meat, beeswax, honey, milk, yoghurt, and butter, hoes, arrows, spears, bows and quivers, leather, livestock and poultry. Other non-local products exchanged were beads, cloth, and dried marine fish. These

Affinal	Visiting Asian traders married daughters of brokers	On the coast, children from these unions became Swahili
	Younger sons of the broker married daughters of the inland suppliers	In the interior, children from these unions became Swahili
Gift exchange	Visiting traders presented gifts before any trade negotiations would begin, hosted banquets to celebrate successful business transactions. These gifts would never be sold or exchanged but became family heirlooms	Coastal traders presented gifts before any trade negotiations would begin, hosted banquets to celebrate successful business transactions. Gifts such as cloth were given to trading partners

markets served local communities but also attracted traders from the region including the Akamba, Oromo, Ariangulo, Giriama, Duruma, Pare, Taveta, Shambaa, Chaga, and Swahili traders from the coastal region. Coastal traders brought beads, brass wire, cloth, and fish and returned with ivory, beeswax, honey, milk products, game meat, millet, sorghum, rice, and other products. The exchange networks that developed were based upon a system of kinship called in Swahili, *Undugu wa Chale*, blood brotherhoods. The region’s perennial shortages contributed to the evolution of networks of interaction and co-dependence. For example, oral traditions show that the Taita, Taveta, Pare, Chaga, and Akamba were engaged in considerable interregional economic contacts. Before the 16th century, these interactions were peaceful. They chronicle a landscape of free movement of people and goods, intercommunity.

Brotherhoods created opportunities for strangers, competitors, and potential enemies to peacefully enter into contractual obligations that legitimised their partnership in the wider community. Membership of the community conferred certain advantages: freedom to mutually exploit resources while enjoying the protection of the whole community. In this sense, brotherhoods served to reduce tensions and suspicions arising from competition for resources while simultaneously providing opportunities for access to technical and sacred knowledge (HERLEHY 1984; KUSIMBA *et al.* 2013b).

As HERLEHEY (1984, 287) writes, the social and economic links between merchants and hinterland communities were mutually reinforced through the blood brotherhood relationship, which forged relationships of trust in an area of ethnic diversity:

“For example, blood-brotherhood could be used by commercial partners to routinise and secure their trading relations, while the kinship links created by the bonds of blood-brotherhood could be used by local merchants to increase the extent of their commercial activity over a large territory.”

Among the Saghala people of the Taita Hills, every man had a Mijikenda “blood brother” who served as host when he visited the coast and other regions to trade, or for pleasure. When his Mijikenda blood brother visited, the same hospitality was accorded to him and his family and friends. He would use the home of his brother as the base

▲ Tab. 2. Relationships merchants created on the Swahili Coast.

from which business was conducted and could expect protection on the journey. The host “blood brother” did this to ensure that his brother was not molested on the homeward journey or was not taken into slavery. People put their own bodies on the line. Their own bodies were their creditworthiness.

Discussion and Conclusion

Trade linked diverse peoples and communities in networks of interaction. Archaeological evidence of trade and exchange between East Africa and the wider Indian Ocean dates to the Early Bronze Age (e.g. SELAND 2014; BEAUJARD 2019). The *Periplus of the Erythraean Sea* mentions that iron lances, hatchets, daggers, and awls made at Muza, east of Aden, constituted trade items consigned for African markets (CASSON 1989). Trade items from the East African coast consigned for foreign markets in India, the Middle East, and China included marine products – tortoise shells and ambergris; animal products ivory, rhinoceros’ horns and cat skins; and vegetable products – mangrove poles, wood, and timber. Turtle shells and ambergris were in high demand in India and China (HORTON 1996, 414).

Al Masudi, who visited East Africa in 912 CE commenting on transoceanic trade between East Africa and Asia, wrote:

“The Zanj exported gold, silver, iron, ivory, tortoise shell, and slaves. Iron was probably the source of the largest profits. Indian merchants came to buy iron and took it back to their own country where they resold it to the manufacturers of iron weapons. The Zanj of Malindi owned and worked iron mines, as did other towns, but Malindi must have been the most important. East African iron was much valued in India, partly because there was no lack of supply and partly because it was of good quality yet easy to fashion and they became masters of the skill of working. The Indians were said to make better swords than anyone else, and weapons made of the iron of Zanj were used throughout the Middle East and countries of the Indian Ocean.” (FREEMAN-GRENVILLE 1962, 20).

Long-distance trade was a crucial factor in the development of complex African chiefdom, states, and urban polities that emerged during the latter half of the 1st millennium of our era to the 16th century CE (BEAUJARD 2018; 2019). The residents who were drawn largely from the region, pursued diverse but complementary vocations, which ranged from hunting, to farming, to fishing, to trading. The locals’ engagement in local, region, and transoceanic trade catalyzed the building of communal and personal wealth which witnessed a steady transformation of the villages and hamlets into small towns, cities, and ultimately to city-states that increasingly boasted large and diverse citi-

zenry. As these cities transformed into states that hosted an economic and political elite that vied for managerial control of sources of wealth, they strove to forge and maintain relationships and build alliances with their transoceanic and hinterland partners (KUSIMBA/KUSIMBA 2005; 2018; KUSIMBA *et al.* 2005). The cities’ prosperity was affirmed and fostered by social and political stability across the region. Evidence for relational and political stabilities is found in, bonds, pacts, and treaties, usually, called blood brotherhoods in East Africa (HERLEHY 1984). Within the cities themselves, alliances sanctified through opportunistic intermarriages among the political and economic elite, which included foreign residents, were the norm. These relationships bound the city’s residents to their neighbours in the rural hinterland. Strangers across the sea were the kernel upon which African connections, contributions, and complexity depended. Continued regional and intercontinental prosperity relied upon forging and maintaining commercial and cultural dialogue among interacting partners (MIDDLETON 2004, 88).

Although we will never know with certainty how prices were set and face-to-face transactions were conducted, the ethnographic and archaeological data available points to the multiple strategies that merchants developed to navigate a political economy that was highly deregulated and unstructured. To plan and execute their journeys, calculate costs and profits, and assess and compare forms of value, African merchants and traders used multiple and fungible forms of money to mediated exchanges across diverse landscapes and communities. The size, scale, and political power of the autonomous states that emerged along the coast and in the interior, limited the circulation, distribution, and acceptance of state-produced currencies, and other foreign monies. Thus, African merchants and consumers used multiple forms of money and assigned different, often regional and seasonal value across overlapping spatial and temporal boundaries (PALAVER 2009, 26; GUYER/PALAVER 2018, 2). This included livestock, glass beads, cowries, textiles and ivory (PALAVER 2009, 25).

Most importantly, this paper has connected merchant strategies to social relationships and to the social meaning of money as a way of symbolising, accounting, and mediating social relationships (ZELIZER 2017). Therefore, money was not merely a means of exchange but a form of payment. Gifting and affinal ties, and blood brotherhoods were also exchanges and symbolic payments of value that gave merchants a social identity and role on a complex landscape (ZELIZER 2005; KUSIMBA/KUSIMBA 2018). Understanding these monies, their diverse spheres of operation in time and space, and the ability to compare and exchange their value with an eye towards social or economic gain were important strategies of traders in the interaction spheres of the East African Coast.

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Reference links figures

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Fig. 6: <http://www.oriinculture.com/community/untold-history-bangles-manillas-slave-trade-money-accessory/>

What Viking merchants had in mind

Exploring Islamic weight standards and weighing practices within early medieval trading networks

by CHRISTOPH KILGER

Calibration, dirham coinage, Islamic mitqāl, merchants, numeracy, weight units, Viking Age

In the Early Middle Ages, with the rise of the Muslim Caliphate trade and exchange expanded on a global scale. Both archaeological and numismatic sources testify to the development of a supra-regional bullion silver economy in Eurasia, which copied monetary standards and practices current in the commerce of the Islamic world. However, we still know little about the monetary habitus in long distance networks of the Early Viking Age (c. 800-950 AD). In this paper, various aspects of measurement, numeracy and units are presented and discussed. It is argued that Viking Age merchants had a profound knowledge of Islamic coinages and their monetary value. They could probably recognise Cufic script and were able to distinguish between dirhams of different emissions by recognising their design, the presence or absence of Cufic letters or signs. Based on observations from an Ethiopian gold merchants weighing gear it is argued that coins and seeds together were used as a means for calibration. Similar practices could also explain the spread and acceptance of weight standards such as the Islamic mitqāl.

Was Wikinger-Händler im Sinn hatten.

Die Erforschung islamischer Gewichtsstandards und Wiegepraktiken innerhalb der frühmittelalterlichen Handelsnetzwerke

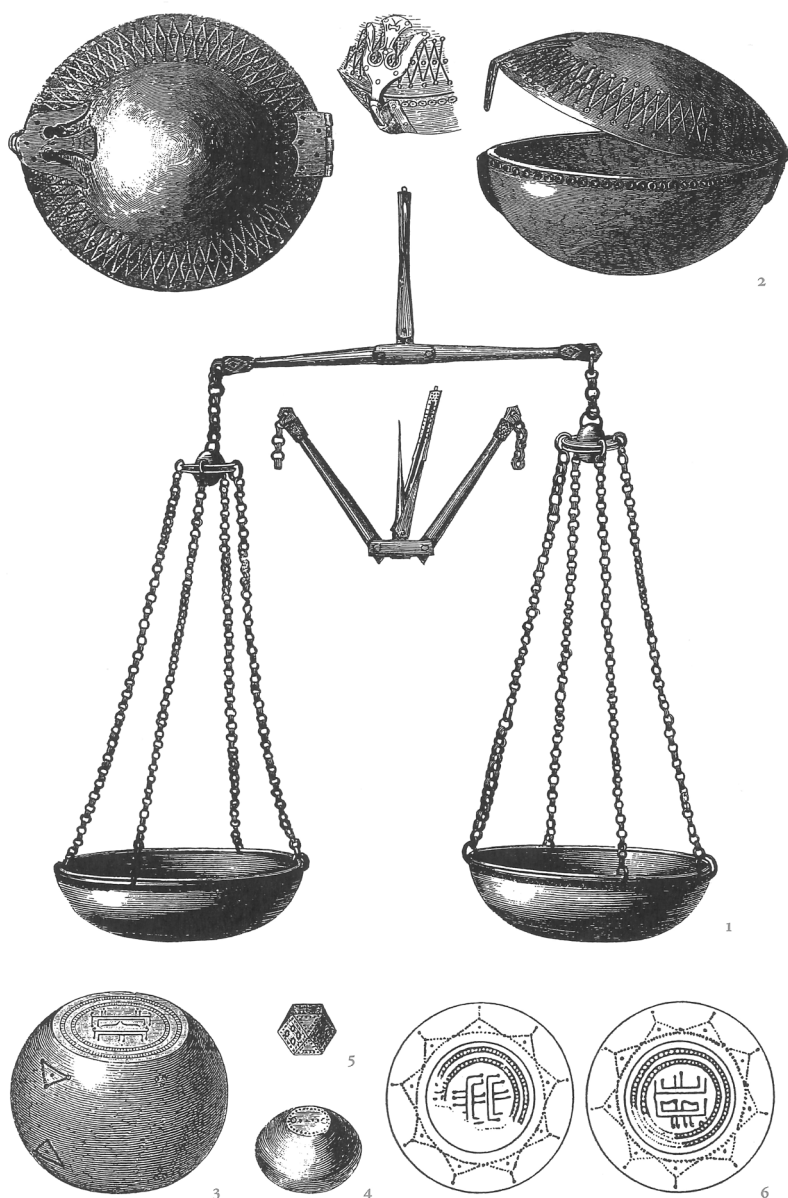
Eichung, Dirhems, islamischer mitqāl, Recheneinheit, Gewichtseinheiten, Wikingerzeit

Mit dem Entstehen des muslimischen Kaliphats im 7. und 8. Jahrhundert entwickelte sich ein weitreichendes Handelsnetz zwischen Asien und Europa. Sowohl archäologische als auch numismatische Quellen bezeugen die Etablierung einer überregionalen Gewichtsgeldzone in Eurasien und die Übernahme geldwirtschaftlicher Strukturen der islamischen Welt. Trotz dieser Anpassungen ist eigentlich wenig über die monetäre Denkweise und gängige Praxis in den Fernhandelskreisen der frühen Wikingerzeit bekannt (800-950 n. Chr.). In diesem Beitrag werden unterschiedliche Aspekte der muslimischen Geldwirtschaft und deren Einfluß auf die Fernhandelszone präsentiert und diskutiert, u. a. wie man in Rechen- und Gewichtseinheiten dachte und sie dann umsetzte. Es wird argumentiert, daß wikingerzeitliche Kaufleute ein grundlegendes Wissen von islamischen Silberdirhems und deren Wert besaßen. Vermutlich konnten sie arabische Schriftzeichen deuten und anhand der Herstellungsweise der Münzen sowie dem Vorhandensein von Beizeichen zwischen verschiedenen Emissionen unterscheiden. Am Beispiel eines kompletten Gewichtssatzes eines äthiopischen Goldhändlers des frühen 20. Jahrhunderts wird veranschaulicht, wie Münzen und Getreidekörner als Gegenstände zur Eichung von Gewichten benutzt wurden. Eine ähnliche Praxis hat vermutlich auch während der Wikingerzeit existiert und kann erklären, wie und warum der islamische mitqāl als Gewichtsstandard akzeptiert wurde und sich in der eurasischen Handelszone verbreiten konnte.

Introduction

In the Early Middle Ages, with the rise of the Muslim Caliphate, trade and exchange expanded on a global scale. With the Arabic expansion, taking place between the 7th and 9th centuries, long distance networks linked the provinces of the Caliphate with the empires of the “Old world” China, India and Byzantium. Even regions outside the orbit of these empires such as Sub-Saharan Africa, the vast steps of western Asia and the immense forest and river landscapes of Eastern and Central Europe were connected with the Islamic global trade system (NOONAN 1980; LOMBARD 1992). Arabic geographers and diplomats provide us, in some instances with detailed information on long distance trade relations in Eurasia and the agents in the exchange networks such as Viking or Rūs merchants (MONTGOMERY 2000; KOVALEV/KAELIN 2007, 9-10).

▼ Fig. 1. Weighing equipment with folding balance (1), balance case (2), oblate-spheroid weights with flattened poles (3-4), cubo-octahedral weight (5) and pseudo-Islamic glyphs on spheroid weight (based on JANSSON 1988, fig. 4; KILGER 2008b, fig. 8.15).



The material evidence of trade relations and merchant activities with the Islamic world is tangible through different archaeological sources (*e. g.* JANSSON 1988; CALLMER 2000; MIKKELSEN 2008). Islamic influence on merchants tools have been discussed, such as the advanced construction of the balance scales and the standardised design and weight of the so-called cubo-octahedral and oblate-spheroid weights (STEUER 1984; 1987; 1997; SPERBER 1996) (Fig. 1).¹ Recent research has focused on the social significance of weights in Scandinavian society; especially aspects of trust, identity and gender in mercantile and commercial settings have been addressed (*e. g.* GUSTIN 2004; PEDERSEN 2008; KERSHAW 2019). Most conspicuous evidence for contacts with the Islamic world are the hundreds of hoards with Islamic silver dirhams discovered in a vast area stretching from the Caucasus and Central Asia in the east to the British Isles in the west (BRATHER 1997; KOVALEV/KAELIN 2007; KILGER 2008a; ADAMCZYK 2014). Thus, both archaeological and numismatic sources testify to the development of a supra-regional bullion silver economy in Eurasia, which copied standards and technologies current in the commerce of the Islamic world.

In this paper, I aim to discuss several monetary aspects of weighing precious metal, and how concepts of measurement, numeracy and units were practiced in long distance networks in the Viking Age. The study of the monetary habitus in the bullion weight economy has so far concentrated on the analysis of weights. What I want to address is the mindset of merchants and their way of understanding and handling Islamic coinages. To provide answers I will compare different aspects of coinage in the Islamic Caliphate and discuss possible connections to the silver bullion weight economy. In this context, I will particularly look at how merchants used dirhams as means of payment and as means of standard. Important here is to address the metrological relationship between dirhams and weight units, such as the Islamic *mitqāl*. To get more clues on merchant practices I will finally present the weighing gear of a modern Ethiopian gold trader (KILGER 2015). This example and other ethnographic sources, not only evidence the impact of the Islamic world trade system that in some areas existed into the early modern period (JOHNSON 1968), but also provide analogies for approaching conventions among Viking Age merchants.

1 The regulated weights and their use in the Viking bullion economy have been presented and discussed by Jane KERSHAW (2019) in the first volume in the *Weight and Values* series. Her paper represents an excellent introduction to this topic and the most recent update in research. My contribution will try to develop some issues addressed by Kershaw, but focus will be on the significance of Islamic coinage for merchants, and the relationship between weights and coinage in terms of metrology and practice.

Dirhams for merchants

Trade with furs and slaves was one of the incentives for the import of large quantities of dirhams to Eurasia. As witnessed by contemporary Islamic written sources furs gained status as precious commodities under the 'Abbāsid rulers (KOVALEV/KAE LIN 2007, 9-12). Prominent in the texts are the Rūs merchant warriors or Rūsiyyah and their hunger for silver. It is not entirely clear, who these merchants were. Their ethnic affiliation has been a matter of a long-lasting contentious debate, whether they were Vikings, Scandinavians of Eastern Swedish origin or Russians (MONTGOMERY 2000, 1-5, 22-25). Current research stresses that not all merchants or people dealing with silver in the Viking period were Scandinavians or Vikings, whatever this word implies. What is important to consider is the agency of different trading communities and ethnic groups in the Eurasian bullion economy (FRANKLIN/SHEPARD 1996; KOVALEV 2005a). Prominent are the nomadic tribes such as the Khazars and Volga Bulgars, who have garnered considerable interest in Viking Age research. Not least because they minted and copied dirhams (RISPLING 1990; 2005), but they are also considered as key players, who connected different trading networks active in Eastern Europe (NOONAN 2000-2001; KOVALEV 2005b).

The Arabic sources provide us with some information, which illuminates certain aspects of this trade, such as travelling routes, commodities exchanged and scattered notes on the value of silver. According to Ibn Khurdādhbeh, the author of an administrative geographical account dated between c. 850 and 885, Rūs merchants travelled with furs and swords to the southern shores of the Caspian Sea and from there on camels to the capital Baghdād (KOVALEV/KAE LIN 2007, 9-10). The importance of dirhams is also evident in the eyewitness account of the diplomat Ibn Fadlān, who met Rūs merchants on his visit to the capital of the Volga Bulgars in the early 920's AD. As evidenced by his report the Rūs handled large sums of dirhams. Every time a merchant earns 10.000 dirhams, roughly 30 kg of silver, a neck-ring was manufactured as a gift to his wife. Other commodities are dark green ceramic beads, highly valued by the Rūs, which were traded for 1 dirham each piece (MONTGOMERY 2000, 6-7). Another source dated to 903 AD attributed to the geographer Ibn Rūstah mentions that the Rūs demanded payment for furs in dirhams. The price for each pelt was reckoned between 2 and 2.5 dirhams, which in weight corresponds roughly to 6 and 8 g of silver (KOVALEV/KAE LIN 2007, 9-12). However, dirhams were not only currency in trade and exchange, but also a means of paying tribute, for instance levies delivered by the Eastern Slavonic tribes to the Khazar Khaganate (ADAMCZYK 2014, 69-73).

Yet trade with slaves, controlled to some extent by the Rūs warrior merchants, has been advanced in recent approaches as a major explanation for the development of the dirham zone in Eurasia (JANKOWIAK 2013, 139-140). One mechanism that propelled the use of dirhams as a viable international currency is that the transaction of human commodities was organised as linked exchanges between middle-men. Such a specialised trade was in need of a stable currency. In this context, Marek Jankowiak has proposed a compelling interpretation as to why the Volga Bulgars started to mint dirhams. Coinage was a means to secure liquidity at the slave market at Bulgar and to increase the demand for coined silver among merchants. Silver dirhams not only advanced as a convenient bulk currency in this particular trading system, but the acquirement of quantities of silver probably also represented wealth and success, and was a means of gaining social status. In due course, the large-scale influx of silver initiated a chain-reaction leading to new economic constellations and webs of social dependencies in the merchants' home countries in Scandinavia (*e. g.* SINDBÆK 2011; KILGER in press).

The social and economic mechanisms in the trade with dirhams raise also questions about the connections of merchants to Islam society and its monetary system. What was the Rūs and other merchants' relationship to Islamic coinage, in terms of understanding the monetary conventions made material in these objects? How were weight standards such as the Islamic *miṭqāl* copied outside the Caliphate in the absence of central authorities who were able to monopolise and enforce monetary standards? Could Viking merchants read dirhams and recognize Cufic signs? Were they able to distinguish between different dirham emissions? These questions relate to two topics, which I will address and discuss in the next sections: First, to monetary aspects of Islamic coinage, such as metrology and weight standards and secondly, to aspects of literacy and the significance of dirhams as textual objects.

Weights and weight units in Viking Age Scandinavia

Studies of weights and their use in Viking Age society have developed into a multidisciplinary research field to explore economic and cultural relations with Islam. Metrological research has provided convincing evidence of weight assemblages used in Scandinavia and the Baltic Sea zone between the 9th and 11th centuries being calibrated with the Islamic *miṭqāl* as a template. There exist a multitude of different weight types made of lead and copper-alloy. The weights, especially of lead, are characterised by their variety of forms (PEDERSEN 2008). Copper-alloy weights, on the other hand,

differ from lead weights because of their geometric and symmetrical design. These include the heavier so-called spheroid or oblate weights with flattened poles and the smaller cubo-octahedral dice shaped weights (Fig. 1). The uniform design of these two categories of weights makes them easily recognisable, enhancing notions of standard, trust and reliability, which probably has promoted their status in exchange relations (KERSHAW 2019, 128-129). In terms of monetary standard, metrological analyses indicate that both weight types were calibrated to a common unit of *c.* 4 g in accordance with the *miṭqāl* (SPERBER 1996, 110; STEUER 1997, 281-289, fig. 204-205). The lighter cub-octahedral weights weigh between *c.* 0.70 and 4.25 g, possibly representing fractions of the *miṭqāl*, whereas the heavy spheroid weights about 4 and 200 g represent multiples of the *miṭqāl*.

Another innovation probably as a consequence of contacts and trade with Eastern Europe and the Caliphate was the introduction of new weight units such as the *ertog* into the existing Scandinavian *øre* weight system and its transformation into a duodecimal system of reckoning close to the Islamic system (KILGER 2008b, 304-307). The identification of the *ertog* unit of *c.* 8 g known from later medieval sources, has been accomplished by the archaeologist Anton Brøgger through his metrological analysis of complete weighing sets from Norway (BRØGGER 1921; for a summary of Brøgger's research on weights see KILGER 2008b, 279-280; PEDERSEN 2008, 140-141). A possible Scandinavian term for the common 4 g unit, or half-*ertog* was *þveiti*, meaning "cut pieces, fragments" (KILGER 2008b, 315-317). The study of Viking Age weights allow conclusions to be reached in respect of some aspects of the silver bullion economy and its practice in merchant communities in Scandinavia and beyond. However we don't know much about the *modus operandi*, such as numeracy and how new standards such as the Islamic *miṭqāl* and units like the *ertog* and *þveiti* were calculated. It is therefore necessary to pay a short visit to the metrological landscape of Islamic numismatics, which provide some keys for understanding the *miṭqāl* and its relationship to Islamic coinage, and how weight standards were defined and reproduced in the Caliphate.



▲Fig. 2. Dirham glass weight from Egypt. Standard of $\frac{2}{3}$'s, 2.76 g (BALOG 1976, no. 434). Governor Yazid b. Hātim (762-769 AD). Inscription "In the name of Allāh, Ordered the amir Yazid b. Hātim, a weight of dirham of two thirds, full weight". No scale.

Coins and seed calculation in Islamic contexts

In metrological research, several dirham standards have been identified. In contemporary Islamic sources, they are referred to as fractions of the *miṭqāl*. On the one hand, the canonical standard of $\frac{7}{10}$ described in the Muslim Sarī'a law and on the other hand the standard of $\frac{2}{3}$'s known from Egyptian glass weights of the 8th century (BATES 1991, 55-56) (Fig. 2). *Miṭqāl* is synonymous to Latin

pondus signifying the ideal weight to measure and evaluate the weight of precious metals such as gold coins (GRIERSON 1960, 255). Originally, the *miṭqāl* was used in the Caliphate as a reckoning template to calculate the weight of silver dirhams. This template was according to the 9th century Arabic historian al-Balādhurī based on an earlier Persian standard for Sasanian drachmas. The change of the *miṭqāl* as a measure to define the weight of the Islamic gold dinar was probably first implemented in the late 8th or early 9th centuries. From then on, the weight of the dirham was defined as the ratio of 10 : 7 of a *miṭqāl* and tied to the weight of the gold dinar. This means that the weight of 10 dirhams corresponds to the weight of 7 dinars. Such dirhams were addressed by al-Balādhurī as 'dirham weight of seven' (GIGNOUX/BATES 1995). In the modern metric system, the gold *miṭqāl* of the early Islamic period corresponds to a value between 4.23 and 4.26 g, confirmed by a number of metrological studies on Islamic gold dinars and extant coin glass weights from Egypt (BATES 1991, 55). Conversely, the standard of $\frac{7}{10}$ corresponds roughly to *c.* 2.97 g and the standard of $\frac{2}{3}$'s to *c.* 2.83 g. How are such fractional standards to be explained, and how are they implemented as weight units?

In ancient monetary systems, coinage and weight standards were connected and established through a common reckoning scale based on a certain amount of seed or coins (RIDGEWAY 1892; GRIERSON 1960; KILGER 2008b, 264-267). The basic gold coin in the Late Roman monetary system, the *solidus* and the *dinar* in the Islamic system were calculated through a certain number of carats from the carob tree. In Latin these seeds are referred to as the *siliqua*, in Arabic described as the *qīrāt* or *kharrūba*. It is assumed, that the *solidus* was equal in weight to 24 *siliquae* and the *dinar* or *miṭqāl* to 20 *qīrāts* (GRIERSON 1960, 255). There is evidence that also the weight and the value of a dirham was reckoned to a certain number of seeds, for example the 'dirham of 13 *qīrāts*' (BALOG 1976, 112, 115; BATES 1991, 55). Interestingly, also the value of Egyptian bronze coins was reckoned in number of *qīrāts*. As evidenced by the coin glass weights, there was probably a system operating with values between 9 and 36 *qīrāts* (BALOG 1976, 24-27). As local currencies the Islamic bronze coinages fulfilled the needs for small-scale commerce in urban markets (HEIDEMANN 2010a, 649-650). Their weight in contrast to *dinar* and *dirhams* was not regulated and the nominal value of one coin or a batch of coins could only be established through weighing. This was especially true of the bronze coinages highlighting that weighing and counting are closely related monetary practices in the Islamic monetary systems.

Another observation that probably carries relevance for the merchant and weighing practices is the correspondence between fractions and a certain numbers of seeds. Theoretically, the *dinar*

of the $\frac{7}{10}$ standard corresponds in weight to the number of 20 qīrāts, and conversely the dirham to 14 qīrāts (GRIERSON 1960, 250-253, with further references). In comparison, the standard of $\frac{2}{3}$'s was probably based on a reckoning scale with lighter grain seeds as building blocks, referred to in the sources as ḥabbas. 3 ḥabbas were reckoned as equal to 1 qīrāt. The miṭqāl in this scale was reckoned to the number of 60 ḥabbas (HINZ 1955, 2; REBSTOCK 2008, 2261). However, the reckoning scale with a certain amount of seeds per unit was not fixed and there existed a variety of ratios in different regions for the "seed-weight" of both dinars and dirhams (REBSTOCK 2008, 2261). As emphasized by Ulrich REBSTOCK (2008, 2255-2256, 2261-2262), metric systems in the Islamic world from the medieval to the early modern period were diverse, and developed into different regional standards. The specific weight of the carob seed was not uniform and varied depending on local and climatic conditions. For instance, the weight of the Graeco-Roman siliqua is estimated to have a specific weight of 0.189 g. In the Islamic weight system, there have been recognised different qīrāts, such as the heavier Syro-Arabian qīrāts of 0.212 g, and a lighter Egyptian qīrāt of 0.195 g (GRIERSON 1960, 251-254). The theoretical weight of an Iraqi or Baghdādī ḥabba has been calculated at 0.0706 g (HINZ 1955, 2; REBSTOCK 2008, 2261).

From a numerical point of view the $\frac{7}{10}$ standard operates with the numbers 10 and 20. Configured in the number of carob seeds the fraction $\frac{7}{10}$ is equal to $\frac{14}{20}$ qīrāts (Tab. 1). In the merchant's view the grain reckoning scale compared with qīrāt scale had some advantages. Ḥabbas probably identical to the barley grain were more easily available in Eastern- and Northern Europe than carob seeds. In addition, the $\frac{2}{3}$ standard of 60 ḥabbas operates with the number 6 as common denominator, which enables the calculation of the miṭqāl in fractions of $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{6}$ as the lowest unit. Configured in number of grain seeds these fractions correspond to 30, 20 or 10 ḥabbas. Interestingly the Islamic law texts mention also a subunit of the miṭqāl, the so-called dānik, which was reckoned as $\frac{1}{6}$ of a miṭqāl and corresponds to between 8 and 10 ḥabbas (MILES

Miṭqāl	number qīrāts	weight qīrāts	coin-denomination glass weights	meanweight	BALOG 1976
1	20	4.23 g	1 dinar	4.20 g	35 sp
$\frac{7}{10}$	14	2.97 g	dirham kayl double dirham	(2.95 g) (5.89 g)	no 680 no 752

▲ Tab. 1. Hypothetical reckoning table with the miṭqāl divided into 20 qīrāts. Metric value Syro-Arabian qīrāt, 0.212 g. Egyptian glass weights: Denominations and metric values (BALOG 1976, 23-27).

1965, 319; REBSTOCK 2008, 2261). By assembling the different elements into hypothetical reckoning charts it is possible to visualise the advantages of the grain scale (Tab. 2). Both the dinar and its known fractions and the dirham of $\frac{2}{3}$'s or 'grain-dirham' can be aligned in the same scale and are compatible with each other. In addition, all coin nominals are attested in the Egyptian coin glass weight corpus with nearly the same metric values (BALOG 1976, 23).

However, as already remarked by Philip GRIERSON (1960, 156) the weight-relationship of 10 to 7, and correspondingly the 14 carat unit, its multiples and fractions "forms not part of any rational metric system". This statement aligns with Michael BATES (1991, 55-56) argument that the 'standard of seven' also known as the 'dirham kayl' or market dirham is rather to be understood as a notional weight unit, detached from the coin object itself. The standard of 10 : 7 defined as a ratio of weight between the dirham and the dinar was, according to Bates, probably introduced during the reign of Caliph al-Ma'mūn 813-833 AD and was a component in his reform of coinage and the minting system².

One has to take into account that the specific weights of seeds presented in the metrological literature are theoretical reconstructions, based on the analysis of coins and glass weights. Equally, one has to be cautious in taking the number of

2 Bates puts forward this interpretation in an unpublished critical comment "Grierson 1963 and the metrology of early Islamic coinage". The comment is accessible on ACADEMIA, https://www.academia.edu/10339637/Grierson_1963_and_the_metrology_of_early_Islamic_coinage (accessed 17.08.2020).

Miṭqāl	subunit dānik	number ḥabbas	weight ḥabbas	coin-denomination glass weights	meanweight	BALOG 1976
1	%	60	4.23 g	1 dinar	4.20 g	35 sp
-	%	50	3.53 g	-	-	-
$\frac{2}{3}$	%	40	2.82 g	1 dirham	(2.76-2.84 g)	no 217, 243-245, 357, 434
$\frac{1}{2}$	%	30	2.12 g	$\frac{1}{2}$ dinar	2.09 g	43 sp
$\frac{1}{3}$	%	20	1.41 g	$\frac{1}{3}$ dinar	1.36 g	42 sp
$\frac{1}{3}$	%	20	1.41 g	$\frac{1}{2}$ dirham	(1.35 g)	no 631
$\frac{1}{6}$	%	10	0.70 g	-	-	-

▲ Tab. 2. Hypothetical reckoning table with the miṭqāl divided into 60 ḥabbas and corresponding fractions based on the subunit dānik. Metric value for grain weight, ḥabba baghdādī, 0.0706 g (REBSTOCK 2008, 2261). Egyptian glass weights: Denominations and metric values (BALOG 1976, 23-27).

seeds per unit at face value. Since the 9th century, various juridical schools in the Caliphate pursued the development of a legal theory of money, which tried to define the intrinsic value of bullion used in exchanges. Of paramount importance for the lawyers was to address a just bargain. At the core was the principle of equilibrium in the weighing of precious metals (HEIDEMANN 2010a, 650). Seed reckoning as a metric definition was a means in the Islamic law texts to define the monetary value of coinage and necessarily doesn't reflect practice (REBSTOCK 2008, 2255). Finally, the suggested reckoning chart for the dirham of $\frac{2}{3}$'s should be regarded as a very simplified model, which by no means can describe the complex and changing metrological landscape in the Caliphate.

Weighing and calibration practices among merchants

Ethnological studies of the use of the *mitqāl* in the early modern gold trade in West and North Africa prove that seed calculation was not a juridical exercise, but proved a real method for merchants in their business. Both the *mitqāl* and larger units such as the ounce were calculated in units corresponding to a certain amount of seeds, such as grains, carob and jequirity beans, or other common fruits (JOHNSON 1968, 548-552). The anthropologist Marion Johnson emphasises the significance of coins as tools of trade. One famous example is the "*mitqāl Nikky*", gold coins which circulated in Trans Saharan trade networks and which were used as calibration weights among Wangara merchants in the early 19th century. Such coins and their ability "to turn the scale" to a certain amount of grains were addressed by the gold traders as coins of full weight (JOHNSON 1968, 552-558). Johnson summarises her observations about African weighing systems and merchant practices as follows:

"Any system based on seeds and grains, if it is not to break up into an almost infinite number of local systems (as it did in Europe, and was to do in parts of West Africa during the nineteenth century) must be held together either by the enforcement of weight standards by some central authority, or by the circulation of coins minted to a standard weight; a closely organized body of traders could perform the same function." (JOHNSON 1968, 552)

In the absence of central authorities, seed calculation and the use of highly standardised coins was probably a method among merchants to copy and reproduce weight standards. Gold coins or other coins of good standard were an excellent calibration device, both for selecting seeds of fairly even weight, but also for calibrating and reconstructing basic units in a weight system. In metrological studies of oblate-spheroid weights, which are common in Viking Age contexts, two closely related stand-

ards have been recognised: One heavier unit of c. 4.23 g, which probably copies the Islamic *mitqāl*, and lighter units, such as the Birka unit of 4.0 g or the Hedeby unit of 4.1 g (SPERBER 1996, 110). As convincingly argued by Jane KERSHAW (2019, 130) these units probably don't represent different standards, but rather are the result of different methods of calibration.

Following the calibration argument, I would like to suggest that differences from an expected standard might be explained by the use of local grains when producing and calibrating weights. For instance, a unit of c. 4.0 g corresponds to the amount of 60 barley or Troy grains with a specific weight of 0.067 g. To conclude, if seeds and coins really were used to calibrate weights of merchants, then the calibration process is conditioned by two circumstances: first, the reckoning scale and the amount of seeds calculated per weight unit, and second, the specific weight of local seeds used in establishing the unit. A question, which needs to be addressed in the following, is if merchants used dirhams as objects for calibrating weights?

The weight of dirhams

There has been long lasting consensus that the dirhams were well standardised and were minted according to $\frac{1}{10}$ standard, close to the value of 2.97 g (MILES 1960, 212-214). However, a recent metrological analysis conducted by Marek JANKOWIAK (2019, 16-17) on 18,000 dirhams mostly from Swedish hoards reveals a more complex picture and raises new questions about standard. How standardised in weight were the dirhams? Jankowiak's analysis indicates a clearer chronological pattern. Whereas early 'Abbāsid dirhams seem to observe a lighter standard weight of about 2.82 g, dirhams minted during the 9th century weigh closely in accordance with the canonical weight of 2.97 g. As stressed by Jankowiak this change in weight to the $\frac{1}{10}$ standard is only notional. In terms of standard deviation, the weight of dirhams increases from 0.2 g at the beginning of the 9th century to almost 0.4 g at its end. In other words, the average weight is close to the 2.97 g standard, but there is a clear dispersion of the weight of individual coins. Jankowiak's observations follow an earlier study by Luke Treadwell conducted on the mint of Samarra, which was active between 838 and 945 AD (TREADWELL 2001). There is similar development at Samarra with an increasing but more pronounced standard deviation with 0.1-0.2 g at the start. At the end of the 9th century, the weight pattern fluctuates between 2 and 4 g. Even though the notional standard of 2.97 g was observed, the fluctuating pattern provides an indication of a deregulation of the coinage and the weight system itself (TREADWELL 2001, 153). As emphasised by Jankowiak the changes can be explained as a difference between

a more rigorous and relaxed standard. However, what constitutes a rigorous standard?

Standardisation is very apparent if 8th ‘Abbāsīd coins are included in the comparison. In order to recognise weight pattern with a higher resolution I have analysed dirhams from a well published Gotlandic hoard by applying frequency distribution histograms. Stora Vellinge (*tpq* 910/911), is one of the biggest dirham hoards from Sweden containing 2674 specimen (CNS 1977: 1.2.38). Stora Vellinge contains quantities of whole and unharmed dirhams, and almost no hacksilver. Only coins without any secondary treatment have been chosen for the analysis. The most common coins in the hoard are issues of Harun al-Rashid 786-809 AD and al-Mutawakkil 847-861 AD. The sample chosen amounts to approximately 300 specimens for each ruler.

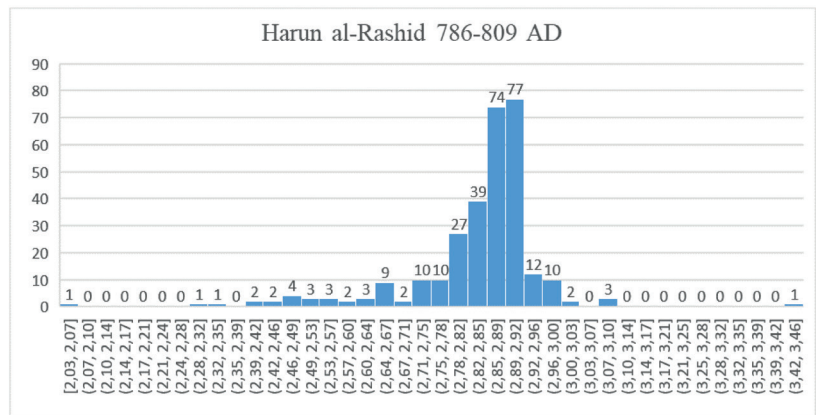
Dirhams minted under al-Rashid have an average weight of 2.83 g. The histogram shows a very concentrated weight pattern, with 220 specimens or 74 % of the sample weighing between 2.78 and 2.92 g. Of these 151 specimens or 51 % weigh between 2.86 and 2.92 g. As shown by the histogram there is clear edge at 2.92 g with only few specimens heavier than this value. Conversely, there is a pronounced “cliff” at 2.78 g with few specimens below (Fig. 3). The weight pattern indicates that dirhams minted under al-Rashid are finely tuned, well in accordance with the standard of $\frac{2}{3}$ ’s.

Dirhams minted under al-Mutawakkil display a more dispersed and smooth weight pattern (Fig. 4). The mean weight is 2.97 g, in accordance with the standard of $\frac{7}{10}$. There is concentration between 2.78 and 3.0 g, 199 specimens or 59 % of the sample. However, more than 100 specimens or 30 % weigh more than 3.0 g. There are also a considerable amount of specimens weighing below 2.78 g.

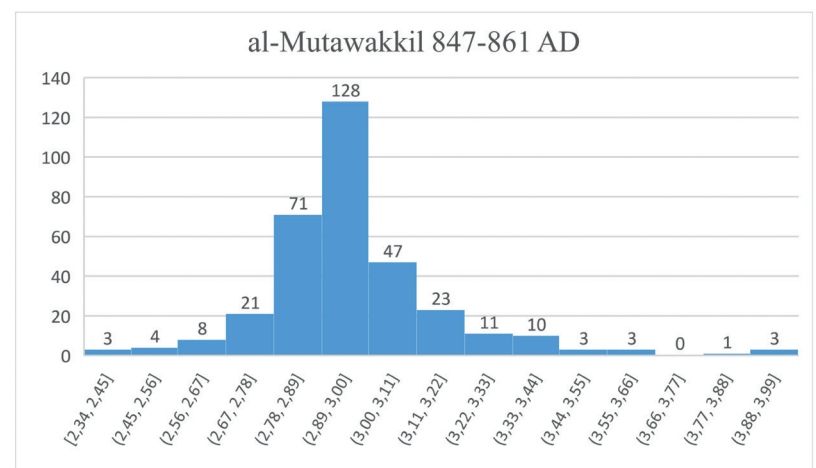
The comparison indicates that coinage under al-Mutawakkil was more relaxed and not as rigorous as dirhams minted under al-Rashid. Coins had a firm weight, and their exchange value could be established to some extent more unambiguously, by counting one by one, whereas later 9th century dirhams had to be weighed. The larger deviation in weight of al-Mutawakkil coinage hints that dirhams could only be handled through weighing in batches.

Dirhams as messengers of texts

The importance of dirhams as currencies and as objects of value in the Eurasian trade networks leads to the question of their significance as textual documents, as messengers of religious ideas and as tokens of monetary concepts. As argued by Egil Mikkelsen the presence of objects with Cufic script in Scandinavia might indicate the influence of Islam in Viking society. Merchants who handled the dirhams could have acted as missionaries and



▲ Fig. 3. Weight dirhams, caliph al-Rashid, Stora Vellinge I, Gotland (*tpq* 910/911) (n = 298).



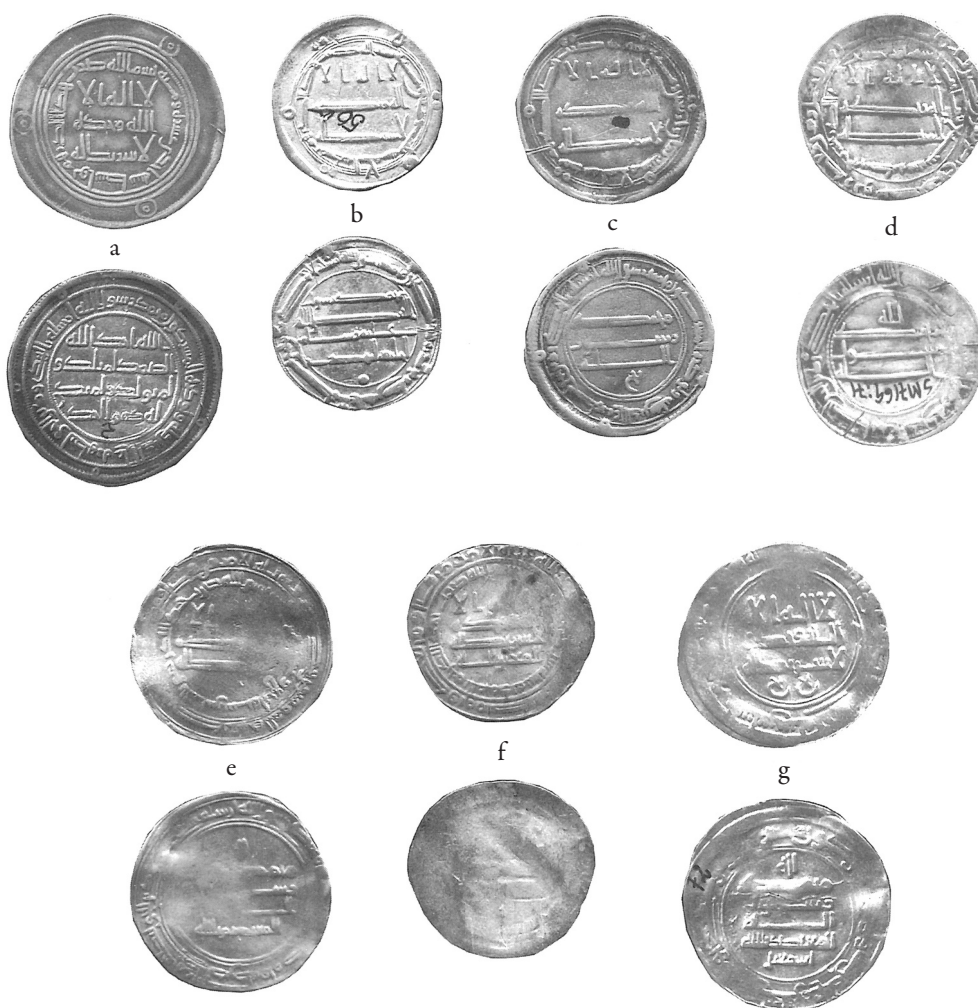
▲ Fig. 4. Weight dirhams, caliph al-Mutawakkil, Stora Vellinge I, Gotland (*tpq* 910/911) (n = 336).

dirhams could have been used as small “missionary tracts” (MIKKELSEN 2008, 545-548). David WASSERSTEIN (1993) on the other hand sees Islamic epigraphic coinages as cultural boundary markers conveying the symbolic universe of Islam. As textual objects he argues that Islamic coins operate on different levels mediating different messages for different audiences. People who handled dirhams on a regular basis could recognize Cufic script and were able to recognize in Wassersteins words the “metalanguage” of Islamic coinage. The presence of script guaranteed its economic value, its legality and authenticity.

People were probably observant of changes in style, scripture and the presence or absence of signs. Ample examples of how merchants checked and processed dinars in their business are provided by later sources such as the Cairoan Geniza dated to the 11th century. In transactions when merchants settled payments with each other they focused on the face value, the appearance and quality of the coins they exchanged (GOITEIN 1968, 230-233). The ability to read the coins, to recognise changes

► Fig. 5a-g. Scale 1:1 (LEIMUS 2007, no. x).

- a. Umayyad dirham with annulet obverse. Anonymous, mint Wāsit, 111 AH, 729/730 AD, 2.82 g (no. 10).
- b. 'Abbāsīd dirham with annulet obverse. Caliph al-Mahdī (775-785 AD), mint Madīnat al-Salām, 163 AH, 779/780 AD, 2.83 g (no. 217).
- c. 'Abbāsīd dirham with annulet obverse. Caliph al-Mansūr (754-775 AD), mint Madīnat al-Salām, with "bakh" sign on reverse, 148 AH, 765/766 AD, 2.83 g (no. 83).
- d. 'Abbāsīd dirham after coin reform under caliph al-Ma'mūn (813-833 AD), mint al-Muhammadiya, 207 AH, 822/823 AD, 2.99 g (no. 549).
- e. 'Abbāsīd "blind" dirham. Caliph al-Mu'tasim billah (833-842 AD), mint ash-Shash, 224 AH, 838/839 AD, 2.95 g (no. 576).
- f. 'Abbāsīd "blind" dirham. Caliph al-Mutawakkil (847-861 AD), mint al-Muhammadiya, 2xx AH, ?? AD, 2.89 g (no. 588).
- g. Sāmānīd dirham. Emir Ismail ibn Ahmad (892-907 AD). Caliph al-Mu'tadid billah (892-902 AD), mint ash-Shash, with "bakh" sign on obverse, 281 AH, 894/895 AD, 3.17 g (no. 1108).



in style, and to notice the presence or absence of small signs is highly relevant for the topic of this paper. Could merchants operating outside the Caliphate like the Rūs understand Arabic and read Cufic letters? If not could they make sense of the metalanguage of dirhams? In order to address these questions, I will present and discuss the inscriptions and the fabric of a selection of Umayyad and 'Abbāsīd dirhams from the 8th and 9th century (Fig. 5a-f).

The epigraphic Islamic coinage was introduced under the reign of the Umayyad caliph Abd al-Malik in 696-698 AD, probably as a means to reunite the growing Islamic state, which was weakened by civil strife. A common coinage eased the operation of centralised rule and the implementation of the Arabic language among the bureaucracy (TREADWELL 2009). Cufic scripture on coins signals also a clear statement by the rulers to make Arabic the language of the empire (WASSERSTEIN 1993, 310-311). The meaning content of Cufic inscriptions on silver dirhams and gold dinars is dense. Legends can contain up to 150 words. Information on the actual ruler, the place and year of minting is always given. The year of minting is expressed according to the conventions of the Is-

lamic calendar of the hijrah (HEIDEMANN 2010b, 161-162). Hijrah meaning "departure" refers to the exodus of the prophet Mohammed from Mecca to Medina in 622 AD.

The religious inscriptions contain parts of the Quran and varying spellings of the kalimah, the creed of the Islamic faith. The inscription in the centre field of the obverse, characterised by its upwards pointing and elongated "scissors" or split tops of the first line says: "There is no god but God alone. He has no associate". The inner marginal legend mentions the mint and the date: "In the name of God! This dirham was struck at ... and in the year ...". (CNS 1977, XVIII). Neither Umayyad nor the earlier 'Abbāsīd coinages had legends on the outer margin of the obverse. Instead, the outer rim was embellished with ringed or circular annulets (Fig. 5a-c).

The reverse renders the Profession of faith, and significantly on 'Abbāsīd coins references to the prophet. On 'Abbāsīd coins the central inscriptions says: "Muhammad is the messenger of God" or "To God. Muhammed is the messenger of God. God bless him/....and give him peace/....and his family". The marginal legends on the reverse provide quotations of the Quran, such as the surahs

48:29 and 9:33: “Muhammad is the messenger of God. He sent him with the guidance and the religion of the truth to make it prevail over every religion, averse though the idolators may be” (CNS 1977, XIX) (Fig. 5a-c).

During the reign of caliph al-Ma'mūn, 813-833 AD a coinage in new Cufic style was introduced (Fig. 5d). Dirhams in the new style were first struck in the mint of Baghdad in 821 AD. The new coinage and its design was from then on also adapted in other provinces (EL-HIBRI 1993, 63-68). The annulets common for earlier coinages were replaced by the victory verse, which is a quotation from the surah 30:3-4: “The command belongs to God before and after, and on that day the believers will rejoice with the help of God”. The verse probably commemorating the military victory of al-Ma'mūn over his half-brother al-Amin were kept on Cufic dirhams. The disappearance of the annulets, the amendment of Cufic text in the outer circle goes also hand in hand with a change in the stylistic fabric of the coins. Whereas old style dirhams emphasized a rectangular and vertical appearance of Cufic letters, dirhams minted after al-Ma'mūn's reform display a more curvilinear style (HEIDEMANN 2010b, 163-164).

It is probable that the annulets on Umayyad and early 'Abbāsid dirhams had a specific meaning in its primary monetary context. What the annulets specifically signaled is not quite clear. As shown by Michael Bates and A. S. DeShazo annulets on Umayyad dirhams displayed the organisation of coinage at the mint of Wasit (DESHAZO/BATES 1974). Each governor who was in charge of the mint had a unique pattern of three annulets. These coins were made of pure silver and easy to recognise. What makes the annulet signature relevant in trade is that merchants or other persons handling dirhams on a daily basis who could not read Cufic script were able to recognise Umayyad and early 'Abbāsid coinages and to distinguish them from later ones. For instance, Sāmānid coins which were exported in great numbers to Russia and Scandinavia in the 10th century (Fig. 5g). Coins with annulets were dirhams of full weight, extremely well tuned in accordance with the *mitqāl* standard. Such coins comparable with the quality of gold dinars, were probably trusted because of their stable weight.

There is archaeological evidence, which might underpin the suggestion that people in Scandinavia selected certain dirhams when producing necklaces with coin pendants in 9th and early 10th century Viking burials. According to an extensive study on Viking Age coin pendants presented by Florent Audy there was preference to choose Umayyad and early 'Abbāsid dirhams as dies to produce silver foils for coin-like pendants (AUDY 2018, 200-203, fig. 9.8). Altogether, there have been recorded 25 specimens of foiled dirham imitations, which belong to three sets of necklaces from three different burials in central Sweden and Norway. As

stressed by Audy the composition is characterised by its homogeneity. Most of the foiled pendants use Umayyad coins as dies and all of them depict the obverse. Most of the pendants have a bearded border. Interestingly for all specimens for which the orientation could be determined the central inscription of the obverse with “scissors” is aligned horizontally but always oriented upside-down. The fixed orientation pattern might indicate according to Audy that the owners responded to the special geometric design of early Cufic dirhams, but weren't able to distinguish between upright and inverted Cufic signs.

Dirham al-kayl and dirham fragmentation

There are several indications that the currency system changed after al-Ma'mūn's coin reform, which in turn had implications for how coined silver was handled as currency inside and probably even outside the borders of the Caliphate. Until the coin reform of al-Ma'mūn the organisation of the mints in the Caliphate was controlled by the provinces and its governors. After the reform, especially under al-Ma'mūn's successors the production of the coin dies became more centralised (HEIDEMANN 2017, 97-98). In due course, the fabric of the dirhams deteriorated and the coins became badly struck. The minting of so-called blind dirhams increases from about the 830s and 840s onwards. Inscriptions are often blurred and difficult to read because of the use of worn out dies (Fig. 5e-f). Probably related to this is the change to a more relaxed notional standard of $\frac{1}{10}$, the “dirham al-kayl” when the exchange value of silver coinage could be settled through weighing only. This change is corroborated by metrological analysis, which I have referred to earlier.

Another phenomenon, probably related to changes in monetary practice is the appearance of coin fragments in 9th century hoards found within the borders of the Caliphate. The earliest evidence is from coin hoards in the Eastern provinces from the 840s onwards (ILISCH 1990). Fragmentation of dirhams is also known from late 9th century dirham hoards in Spain (HEIDEMANN *et al.* 2018). As argued by Stephan Heidemann fragmented dirhams in this period, substituted bronze coinages in some provinces. Until then bronze coins and cast copper coins comprised the bulk of small change for daily expenses (HEIDEMANN 2002, 362-365; 2009, 502-503, fig. 9-17). The significance of hack-silver in everyday commerce in the Caliphate becomes also evident by the increasing numbers of fragmented dirhams from excavations of urban sites in the Levant (HEIDEMANN 2009, 503-504, fig. 18-20). If these changes in the monetary sphere are indications of an economic crisis can be debated. In any case weighing developed as a necessary practice due to the changing monetary structure in the Caliphate.

Conversely, weights and hacksilver also appear in stratified contexts from urban sites in Scandinavia during the third quarter of the 9th century (GUSTIN 2004, 312-314; HÅRDH 2008, 114; PEDERSEN 2008, 132-134). In light of the growing evidence of small finds from urban and productive sites in the North Sea and Baltic Sea regions, the significance of hacksilver as a petty currency in everyday exchanges has recently been elaborated on by Jane KERSHAW (2019, 135). Silver was weighed in minute proportions and there seems to be a strong correlation among settlement finds between the use of the small cubo-octahedral weights and hacksilver. This might imply that the acceptance of fragmented dirhams in the Caliphate as currency and the use of hacksilver in the Eurasian bullion economy were to a certain extent related.

Weights with Islamic script and signs

There is an indication that craftsmen who manufactured weights in the dirham bullion zone outside the Caliphate possessed knowledge of Islamic dirham coinages, of the fabric, design and possibly also Cufic script. Cufic letters appear on weights of oblate-spheroid type weighing between c. 100 and 150 g (Fig. 1,6). Obviously, they copy the epigraphic inscriptions of dirhams, but they are not true Arabic but represent crude imitations of the creed of faith *rasul Allah* “the prophet of Allah”. Another detail is the depiction of the sign “bakh” which is Arabic and means “choice” and “good quality” (SPERBER 1996, 96-101) (Fig. 6). The “bakh” sign appears on 8th century emissions of ‘Abbāsīd caliphs, such as al-Mansur and al-Rashid, and also later on Sāmānīd dirhams (Fig. 5c,g). The phenomenon of the pseudo-Islamic glyphs has been inter-

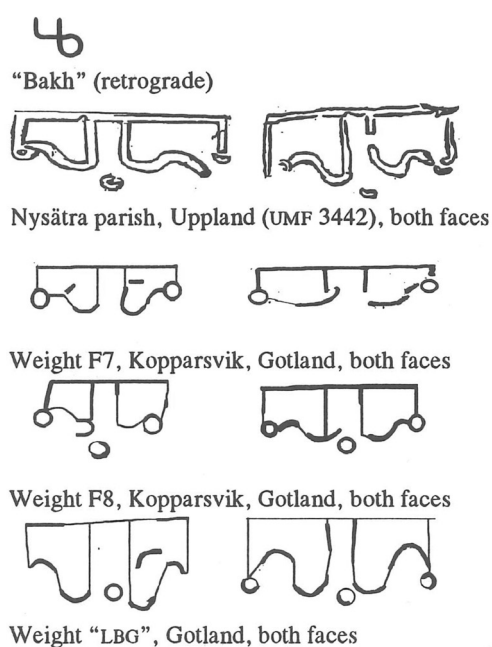
preted from different angles, such as the owners access to precious metals, communication in trade relations and identity of merchants (*e. g.* SPERBER 1996, 96-101; GUSTIN 1997, 168-173; FERNSTÅL 2007/2008; PEDERSEN 2008, 169-170; KILGER 2008b, 307-309). In any case, the signs were made after the production of the weights and they indicate that the artisan had Islamic coinages in mind when they signed their product.

There is archaeological evidence that spheroid weights were also manufactured in Scandinavia in Viking towns Hedeby and Birka, and also later in Sigtuna in the early 11th century probably under the supervision of the Swedish king (SÖDERBERG 2006; 2015). On the other hand, the numismatic sources points to an origin in the East and to a mercantile Islamic connection. Oblate-spheroids were clearly inspired by Late Roman and Byzantine prototypes (*e. g.* KISCH 1965, 97 fig. 51; STEUER 1987, 427, 432), but in Islamic times such weights have only been documented outside the Caliphate. Their most eastern distribution is from cemeteries of the Saltovo-Majaki culture, commonly associated with the Khazars (STEUER 1997, 46). They also appear in the Volga-Bulgarian area (SCHULTZÉN 2009, 34, fig. 16, with more references). Both the Khazars and the Volga Bulgars started an indigenous coinage imitating official dirhams. The Khazarian imitations date to the 830s, whereas the imitative Volga Bulgarian coinage commences in the early 10th century (RISPLING 1990; 2005).

Thus, it is reasonable to assume that oblate-spheroid weights originated in a borderzone beyond the Caliphate. Both the Khazars and Volga Bulgars were accustomed to Islamic scripture and their coinages evidence that they were knowledgeable of the Islamic monetary system, probably also the *mitqāl* weight standard and related weighing and reckoning practices. They were possibly mediators of the Islamic currency system to other merchant groups who were active in the Eurasian silver bullion economy.

A merchant's toolkit from Ethiopia

There exists only a few complete trading-sets from the Viking Age in Scandinavia. The existing sets containing weights and scales are mainly known from burial contexts (*e. g.* KYHLBERG 1980; PEDERSEN 2000; HOLM 2017). The few complete sets have been analysed thoroughly in metrological research and used to reconstruct Iron Age weight standards and units (*e. g.* BRØGGER 1921; STEINNES 1927; KILGER 2008b, 283-285, 313-315; PEDERSEN 2008, 140-144). However, as remarked by several researchers the completeness of weighing equipment could be conditioned by burial traditions, religious customs or social conventions, which necessarily does not reflect the handling of weights and scales in economic practice. There are also source-critical factors to consider such as unprofessional excavations



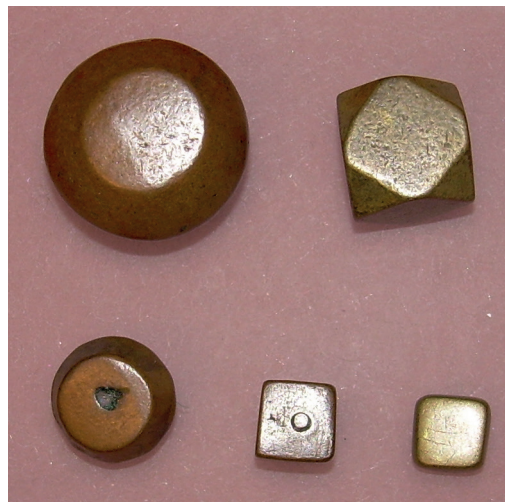
► Fig 6. The sign “bakh” depicted retrograde on oblate-spheroid weights from Sweden (SPERBER 1996, fig. 8.8).



◀ Fig 7. Gold traders complete weighing tool kit, Bani-Shangul, Ethiopia (donation by P. Sandvik, Vitenskapsmuseum, Trondheim E 485-38).

or recovery by chance which could have resulted in not all components of a weighing set being recorded (GUSTIN 2004, 113; PEDERSEN 2008, 144; HOLM 2017, 44). Modern ethnographic sources from Eastern Africa, however, offer insights on the range of different components, which once were part of the complete equipment of a Viking Age merchant. As we will see below, weighing equipment of modern African gold traders includes not only weights and scales but also coins and organic materials such as seeds, namely jequirity beans (lat. *abrus precatorius*), and carob beans. In addition, ethnographic accounts also provide unique insights about practice as to how weights, coins and seeds were used by merchants (KILGER 2015).

In 1977, the Norwegian engineer Per Sandvik presented a wooden box to the Vitenskapsmuseum in Trondheim (TINGSTAD 2007). The box contained complete weighing equipment from a gold trader from Beni Shangul province in Ethiopia (Fig. 7). Sandvik had acquired the equipment during his stay in Ethiopia between 1930 and 1931. By fortune, SANDVIK (1935) also published a travel account of his encounter with the Ethiopian gold traders, which provide additional information on conventions and how merchants used their weighing tools. Sandvik's set of weights contain several brass weights that are strikingly similar in shape to Viking-Age and early Islamic weights (Fig. 8). The foldable scale and the shape of the weights, but also the taxonomy of weight units applied by the merchants that Sandvik renders in his account, suggest



◀ Fig 8. Brass weights from weighing tool kit, Bani-Shangul, Ethiopia (Vitenskapsmuseum, Trondheim E 485-38).

connections with the ancient monetary system of the Islamic world.

According to SANDVIK (1935, 70-72) every gold trader classifies his brass-weights with a nomenclature. The biggest unit was the okét. All other units were reckoned as divisions of the okét (Tab. 3). $\frac{1}{2}$ of the okét was named alada or aumam. $\frac{1}{4}$ okét was equivalent to a mutagalla, which refers to the arabic *mitqāl*. $\frac{1}{8}$ of an okét was a gisma and one-sixteenth corresponds to a grat. A gisma could also be calibrated using 40 small red beans, addressed by the merchants as *ḥabbas*. These *ḥabbas* probably refer to the jequirity beans, which were part of the Trondheim weighing equipment.

Okét/ subunits	Okét fractions	number ḥabbas	troy	Okét metric value	weights metric value	weights shape
okét	1	320	480	31.2 g	30.598 g (- 0.602 g)	half-spherical
alada	½	160	240	15.6 g	15.230 g (- 0.37 g)	cubo-octahedral
mutagalla	¼	80	120	7.8 g	7.963 g (+ 0.163 g)	biconical
gisma	⅛	40	60	3.9 g	4.088 g (+ 0.188 g)	cubic
grat	⅙	20	30	1.95 g	2.057 g (+ 0.107 g)	half-cubic

▲► Tab. 3. Reckoning table of the weighing set from Bani Shangul.

calibration objects	number ḥabbas	objects metric value
gersh coin	14	1.395 g
glass bead	10	0.955 g
carob beans (5)	10	1.033 g

The okét had a metrical value of 31.2 g in some districts in Ethiopia, in others 28.08 g. Unfortunately Sandvik leaves no further explanations for this difference. The unit of 28 g corresponds to the standard weight of a Maria Theresia thaler, a silver bullion coin minted by the Austrian empress Maria since 1741. Thalers circulated in East Africa from the 18th century onwards. Because of their high silver content, they were embraced as means of payment in the population. Sandvik mentions that according to the common opinion, the picture on the coin was not the portrait of the Austrian Empress, but that of the ancient Queen of Saaba. The bust of the empress is usually depicted with a brooch on her shoulder. The brooch is believed to represent the Queen's navel. Interestingly Sandvik notes that if the brooch is missing the coin will not be accepted.

In the gold buyer's toolkit from Trondheim, there was no Maria Theresia thaler, but an Ethio-

pian silver coin, the gersh also called piaster, minted by Ethiopian emperor Menelik II (1889-1913) (Fig. 9). The same ruler also minted a higher nominal, the birr. Both the gersh and the birr follow the weight standard of the thalers and copy its style and symbolism with the bust of the emperor on the obverse and the crowned Ethiopian lion on the reverse. The weight of the gersh also known as piaster is 1.4 g and the birr 28 g. This means that 20 piaster correspond in weight to 1 birr. However, in contrast to the pure silver coin of Maria Theresia thaler, the gersch contained only 0.835 g of fine silver. According to Sandvik, this had lasting consequences for the piasters as a currency in everyday trading. As an official currency the piaster was only accepted in the capital Addis Abeba. On rural markets outside the capital the piasters were valued at lower exchange rates. The Ethiopian bank in Addis Abeba gave 16 piasters for the birr. In the rural areas the birr was handled at a lower exchange rate between 12 and 14 piasters. Thus as a currency the piaster was not appreciated, but as a calibration device it is a necessary component in the weighing set.

Based on Sandvik's report it is reasonable to assume that there were two different standards in the gold trade in Ethiopia. There is a gold standard with the okét ounce as the basic unit for weighing gold dust. The okét was probably current in gold trade transgressing the national boundaries of Ethiopia. It corresponds with the ounce in use in the gold trade in Western Africa and the Ivory coast (JOHNSON 1968, 549). The Ethiopian coin represents the official weight standard following the weight standard of the popular Maria-Theresien-Thaler emissions.

Based on Sandvik's account and the metrological analysis of the weighing gear from Bani Shangul I suggest the following reckoning table (Tab. 3) as a basic taxonomic model. Metrological values of the weights and the okét standard are rendered both in numbers of ḥabbas and troy grains and according to the modern metric gram system. The table, a telltale of logic arithmetical relations between weight and numbers, reveals how the gold merchant organised his weighing set.³

As an analogy, the weighing set from Bani Shangul, provide several hints to understand the Viking Age situation. First of all, the coin is a key object as it provides a template or copy of a common weight standard. Standardised in weight it is a perfect calibration device. The weight of the coin corresponds to the number of 14 ḥabbas. Secondly, seeds are not only necessary in weighing procedures as the smallest building blocks, but employed as numerical devices they can materialise any weight unit through counting. Thus in a weighing situation between two trading partners, the weights employed in the

▼ Fig. 9. Small objects from weighing tool kit, Bani Shangul, Ethiopia. Jequirity beans, Carat beans, glass bead, piece glazed porcelain, coin Ethiopian piaster, emperor Menelik II (1889-1913) (Etnographic collection Vitenskapsmuseum, Trondheim E 485-38).



3 All the objects in the box have been weighed with an electronic scale from the Coin Cabinet at Vitenskapsmuseum in Trondheim. The three jequirity beans had fairly the same weight at c. 0.1 g (0.106, 0.103, 0.093), whereas the carob beans show a larger variation in weight (0.252, 0.232, 0.212, 0.170, 0.167). The piaster weighs 1.395 g, the glass bead 0.955 g and the round piece of porcelain 1.276 g.

bargain can be checked through both coin and seed calculation. Third, the basic unit, like the okét ounce is divided into subunits or fractions which are classified by the merchant through a nomenclature. This means that any weighed substance can be assigned a nominal value. For instance, 1 gisma is reckoned as $\frac{1}{8}$ of a okét. This corresponds in the modern metric system to the weight of 3.9 g or to the number of 40 habbas.

The reckoning table underlines the argument put forward in this paper that weights in weighing sets were calibrated with common and trustworthy coins in circulation. The beans or seeds are the second calibrating component as they constitute the smallest building blocks in the set. In order to ease weighing procedures the merchant could use also other objects like glass beads. The bead in the set constitutes a larger building block in the weighing set. It corresponds in weight roughly to the amount of 10 habbas. Similarly the five carob beans although more irregular in weight correspond to the weight of 10 habbas. Importantly, the weight of the lowest weight unit the grat must be determined first. From that point on any unit could be built up and checked through double-weighing.

Conclusions

Merchants in the Viking Age were knowledgeable about the concept of Islamic currencies and weight standards, not only in theory, but also methodologically. By methodologically I mean a knowledge on how coins and other objects, for instance seeds, constituted nominal building blocks in weight standards and units. Ethnographic sources from the early modern period in Africa evidence that weight standards were reckoned and calibrated through seeds, grains, fruits and coins of fairly standardised weight. Based on observations from an Ethiopian gold merchants weighing gear and its description it is argued that coins and seeds together were used as a means for calibration. Similar practices could also explain the spread and acceptance of weight standards such as the miṭqāl in the Viking Age networks.

The second argument put forward in this paper is that Viking Age merchants had a profound knowledge of Islamic coinages and their exchange and monetary value. Even though not all merchants could read Cufic script they were probably able to distinguish between dirhams of different emissions by recognizing their design, changes in style and the presence or absence of Cufic letters. Two such signs are presented and discussed in this paper. The quality mark “bakh” visible on oblate spheroid weights and annulets visible on the outer rim of the obverse of Umayyad and early ‘Abbāsid coinages.

Weighing and counting of coinage in an Islamic context are intimately related. In the changing monetary landscape after caliph al-Ma’mūn’s coin reform the weighing of coins became a necessity.

This process started after 821 AD when the design of Islamic coinage changed. It accelerated during the second and third quarter of the 9th century when the fabric deteriorated with dirhams becoming increasingly badly struck. In this period also the mean weight of dirhams started to fluctuate and it was not possible to settle the nominal value of the coins through counting. Probably related to this is the fragmentation of coinages, which commences after 840. These monetary changes probably affected practices and induced a different attitude to coined silver in Islamic society. The use of hacksilver in the bullion weight economy of the Viking period, demonstrates that similar processes simultaneously developed outside the Caliphate.

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Abbreviations

AH	after hijrah (Islamic calendar)
CNS	Corpus Nummorum Saeculorum IX-XI qui in Suecia reperti sunt. Catalogue of coins from the 9 th -11 th centuries found in Sweden. Kungliga vitterhets-, historie- och antikvitetsakademien (Stockholm 1975).
<i>tpq</i>	<i>terminus post quem</i>

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Small change in Campania from the fourth to the first century BC, and the newly discovered Second Punic War Roman mint of Minturnae

by CLIVE STANNARD

Neapolis, Minturnae, Pompeii, Second Punic War, small change, Roman economic history

The focus of the paper is how coins that do not contain full metal value – token money – derive their value. In some cases this is by fiat: the power of an authority to decree and police a value, but the history of bronze coinage in Campania from the 4th to the 1st century BC shows that it can also rely on utility alone, that is, on the market's demand for small change. This is how the token bronze of Neapolis came to be accepted throughout Campania between the 4th century BC and the Second Punic War: utility value – the usefulness of coin in market economies – meant that other cities fetched bronze coin from Neapolis, to supply their local markets. It is often thought that Rome imposed its currency on Italy, as its rule expanded, but a review of the coins found in Minturnae and Pompeii shows that this is not correct: Roman bronze did not reach Campania in any quantity, while its silver became de facto the coinage of the area with the huge volumes produced, with no coercion needed. However, I document a hitherto unrecognised Second Punic War Roman bronze mint at Minturnae; overstrikes on Neapolis, Rome, Syracuse and Carthage show that Minturnae played an active naval role in the war, receiving captured coin from Sicily and Africa. I describe how a crisis of small change then spread throughout all central Italy, which led to the use of informal, non-state coinages at Minturnae, the importation of Ebusan coin at Pompeii, ca. 140/130 BC, and the coinage of the Pompeian pseudo-mint, which imitated and mixed the types of Ebusus, Massalia and Rome. The pseudo-mint probably lasted until the Social War, when Pompeii's period of great wealth ended with Sulla's conquest. None of these informal coinages relied on anything but utility value; none can be usefully considered as counterfeits; and the evolution of Roman bronze into a token coinage was not a reason for counterfeiting.

Kleingeld in Kampanien vom vierten bis zum ersten Jahrhundert v. Chr. und die neu entdeckte römische Münzstätte Minturnae aus dem Zweiten Punischen Krieg

Neapolis, Minturnae, Pompeii, Zweiter Punischer Krieg, Kleingeld, römische Wirtschaftsgeschichte

Im Mittelpunkt des Beitrags steht die Frage, wie Münzen, die nicht den vollen Metallwert enthalten – also Wertmarken-Geld (token money) – ihren Wert ableiten. In einigen Fällen basiert dies auf fiat: durch die Befugnis einer Behörde, einen Wert zu bestimmen und zu überwachen. Die Geschichte der Bronzemünzen in Kampanien vom 4. bis zum 1. Jahrhundert v. Chr. zeigt aber, dass sie sich auch auf die reine Verwendbarkeit, d. h. auf die Nachfrage des Marktes nach Kleingeld verlassen kann. Auf diese Weise wurde die Wertmarken-Bronze (token bronze) von Neapolis zwischen dem 4. Jahrhundert v. Chr. und dem Zweiten Punischen Krieg in ganz Kampanien akzeptiert: Der Gebrauchswert – die Nützlichkeit von Münzen in der Marktwirtschaft – führte dazu, dass andere Städte Bronzemünzen aus Neapolis holten, um ihre lokalen Märkte zu versorgen. Es wird häufig angenommen, dass Rom seine Währung Italien mit der Ausweitung seiner Herrschaft aufzwang. Eine Überprüfung der in Minturnae und Pompeii gefundenen Münzen deutet aber daraufhin, dass dies nicht stimmt: Bronze aus Rom erreichte Kampanien nicht in ausreichender Menge, während Silber faktisch als Material für das Münzgeld diente, das in der Region in riesigen Mengen produziert wurde, ohne dass es eines Zwangs bedurfte. Hierbei wird jedoch erstmals eine bisher unbekannte römische Bronzemünzprägung des Zweiten Punischen Krieges in Minturnae dokumentiert. Umprägungen in Neapolis, Rom, Syrakus und Karthago lassen erkennen, dass Minturnae eine aktive seebezogene Rolle in diesem Krieg spielte und erbeutete Münzen aus Sizilien und Afrika erhielt. Ich beschreibe, wie sich dann in ganz Mittelitalien eine Kleingeldkrise ausbreitete, die zur Verwendung informeller, nichtstaatlicher Münzprägungen in Minturnae, zur Einfuhr der ebusischen Münze in Pompeii um 140/130 v. Chr. und zur Prägung der pompejanischen Pseudomünzen führte, welche die Typen Ebusus, Massalia und Rom imitierte und vermischte. Die Pseudo-Münzstätte prägte wahrscheinlich bis zum Bürgerkrieg, bis Pompejis Zeit des großen Reichtums mit der Eroberung durch Sulla endete. Keine dieser informellen Prägungen stützte sich auf etwas anderes als den Gebrauchswert; keine kann sinnvoll als Fälschung betrachtet werden, und die Entwicklung der römischen Bronze zu Wertmarken-Geld (token coinage) war kein Grund für Fälschungen.

The scope and aims of this paper

All dates are BC, except when otherwise specified.

Coinage was a seminal invention of 7th century Asia Minor (Lydia), which spread rapidly throughout the Mediterranean. Put simply, it meant replacing fragments of metal weighed out in each transaction with mass-produced objects of standardised weight, and hence value: coins. This meant that value could now be transferred in countable objects, which greatly facilitated commerce.

At a second stage, token coins appeared, that is, coins that did not themselves carry full metal value, but were exchangeable with coins that did. These were usually the small units and of copper-based alloys, in which it was possible to make coins of usable size at a relatively low cost. They supplied liquidity to the market, which led to a higher overall speed of circulation of the monetary mass. The lack of full intrinsic value meant that token coinage often relied on *fiat value*, which is the power of an authority, usually a state, to decree and enforce a value and the exchangeability of tokens with precious metal coin. High-value precious metal coinage and bronze small change had largely discrete functions and patterns of circulation: markets were structurally segmented by price, and bronze was needed for low-priced goods of daily use. Markets grew to depend on such coins for many transactions, and this need endowed bronze small change with *utility value*. The more inadequate the supply of small change, the higher the utility value, and when need is great and supply poor, small change can function with utility value alone.

Fiat coin is by its nature local, because its acceptability is limited to the reach of the authority that decrees its value; it therefore does not have exchange value beyond the local polity and market. Moreover, individual town markets – in which foodstuffs, cooked food, clothing, minor services, and sundries, including the retail sale of bulk imported products, were traded – were largely independent of each other, so that their stocks of small change circulated locally. Token coins could not be used for long-distance commerce, and tended to stay within the borders of the polity issuing them. Precious metal, on the other hand – the currency of long-distance trade, the stuff of political action and the sinews of war – is liquid, because its intrinsic metal value is realizable in other polities. It moves with armies and trade across polities.

This is reflected in differences between the archaeological finds of precious metal and bronze coins: once precious metal coins left their polity of origin, they were often transferred on to further destinations, and they were frequently melted and recoinced, which was seldom the case with bronze. The result is that silver and gold coins are most often found in hoards, while most bronze is from casual losses; this means that bronze often better

reflects the coins in a particular place at a particular time.

I will systematically document finds of small change of between the 4th and the 1st centuries from a broad area of central Italy that runs from the city of Minturnae in the north, on the border between Latium and Campania, to Pompeii in the south, and inland into Samnium, towards Aesernia and Larinum (Fig. 1); for simplicity, I call this area ‘Campania’. It was rich and densely populated; as Michael FRONDA (2010, 112–113) notes, “The average distance between urban centres in Campania was only about eleven kilometres, the smallest ratio of any region in Italy, so even the most remote rural denizens would have been within walking distance of an urban centre”.

Minturnae, which Rome had conquered in 314, became a *colonia maritima* in 296/295. It was in a strategic position, because the *via Appia*, constructed in 312, crossed the River *Liris* from Latium to Campania at this point, and it was also a safe and commodious harbour, on a navigable river. This made it a bridgehead for rapid and sustained Roman military intervention in Campania. In the 2nd and 1st centuries, the city also developed a substantial trade in wine from its hinterland with Spain and Gaul, and after the Second Punic War (218–201) it was one of the first cities of the Tyrrhenian coast to exploit the mining and commercial potential of Spain (STANNARD *et al.* 2019).

Pompeii was a Samnite city and port in the Sarno valley, with rich agricultural soils because of its proximity to the volcano, Vesuvius. Pompeii – like many cities of the area – became a Roman ally after the Third Samnite War, which ended in 290. After the Second Punic War, Pompeii entered a golden age. As an ally, it was obliged to supply troops to the Roman legions, who were present at the sack of Corinth in 149, and it shared in the great wealth that flowed into central Italy with Roman conquests. It also developed an extensive wine trade, particularly with Spain and Massalia (STANNARD *et al.* 2018; STANNARD/CHEVILLON in press). Its great period ended when it rebelled against Rome in the Social War (91–87), was conquered by Sulla in 89, and subsequently received a colony of Sulla’s veterans.

I want first to show how the particular history and circumstances of Campania resulted in the token bronze of the Greek city of Neapolis becoming the common coin of the area, in cities over which it had no hegemony, where it could not have decreed values. Utility value trumped fiat value, as the pre-monetary Italic peoples that took over most Greek cities adapted to the pre-existing Greek monetary tradition.

I will also investigate whether or not Rome controlled or sanctioned the coinages of its allies and colonies, which is the received opinion. Coin finds from Minturnae and Pompeii show that it did not, nor did Rome make any effort to supply



its client cities with coin. The one occasion when Roman coin appeared in Campania in any quantity was during the military manoeuvres of the Second Punic War. Rome made an until now unrecognised issue of bronze coins at Minturnae to support the war effort, which I document.

The war was a time of monetary chaos, during which Roman bronze – originally a heavy, cast bronze coinage of intrinsic or near intrinsic metal value – underwent a suite of reductions in the weight of the *as* (the bronze unit) and its minor units. These are described by the duodecimal fraction of the Roman pound at which the *as* was now struck, at triental, quadrantal, sextantal and uncial weight. However, the Minturnaean emission does not conform to the weight of any of these, and is clearly a token coinage; it is worth rethinking how much Roman bronze really aimed to embody full metal value at this stage and later. Overstrikes in the Minturnaean emission on coins captured by the Romans in Sicily, and in North Africa after Rome invaded the Carthaginian heartland in 204, testify to the important naval role of Minturnae.

The coin finds at Minturnae and Pompeii in the 2nd and 1st centuries must be understood in the context of the acute insufficiency of small change that all west-central Italy – Rome, its colonies and allies – suffered between the mid-2nd century and

the Principate (STANNARD 2018a). A number of factors were behind this: a vast increase in wealth resulting from successful warfare, and a massive growth in the Roman silver monetary stock, not matched by its bronze coinage after 146; rationalised, slave-based agricultural production in Campania feeding extensive sea-borne trade in the western Mediterranean; the exploitation of the mineral resources of newly conquered Spain, particularly silver and lead; as well the end of Neapolitan coinage just before the Second Punic War, and the closing of the Roman bronze mint in the 80s. This conjuncture led to communities adopting a variety of *ad hoc* stratagems to provide their markets with small change. Minturnae relied on non-state informal coinages, some locally made, and some coming from Latium, as well as imitations of Roman coin. Pompeii adopted other solutions: it first imported a very large group of bronze coins from the Punic island of Ebusus (Ibiza), and when these did not suffice, a pseudo-mint – that is, a non-state mint that over time makes coins that systematically copy and mix the types of a number of foreign mints, here Ebusus, Massalia and Rome – supplied the city with small change until the Social War. In both cases, neither metal value, nor fiat value, seems not to have been important: the market needed coin, and utility value sufficed.

▲ Fig. 1. Campania, and Roman colonies and allies.

How Neapolitan token bronze became the coinage of all Campania in the 3rd century

Campania had long experience of coinage. The first silver coins were struck after 475 in the Greek cities of Cumae – the oldest Greek colony in Magna Graecia – and its colony, Neapolis, after *ca.* 450 (HNI, 4); as early as 350, Neapolis began striking a bronze coinage, which continued until about 225; it was by far the largest coin-producer in Campania.

In the 5th and 4th centuries, Samnite tribes – Oscan-speakers from the hills, who were not yet coin-users – came down towards the coast, and the Campani – Oscan-speakers of mixed origin – took the rich city of Capua from the Etruscans about 424, and Cumae from the Greeks in 421 (CERCHIAI 1995, 187-190). During the 5th century, Samnites took over Pompeii.

Rome fought three major wars against the Samnites between 343 and 290, which drew her over the River *Liris*, the border between Latium and Campania. In 326, the Greeks of Neapolis allied with Rome, in order to rid themselves of their Samnite occupiers, and this alliance became the corner-stone of Roman control of the region, bolstered by other alliances, including with Pompeii after the Third Samnite War. Rome also planted a number of colonies in strategic places.

Building on its status as an early monetized Greek city in a predominantly Sabine region – where tribes, not cities, were the initial political unit – Neapolis came to supply the bulk of coinage for the region, and even to strike both silver and bronze for a number of other communities.

This was not inevitable. Neapolis was not the largest town in Campania, with an area within the city walls estimated at between 72 and 81 ha, which was fully built up in Imperial times. Only five or six peninsular towns are likely to have counted more than 100 ha within their walls, and, of these, four were in Campania: Capua (200 ha), Teanum (90-124 ha), Puteoli (100-120 ha, made a colony in 193), and Nuceria (116 ha) (DE LIGT 2012, 236). Neapolis's population would have been about the same as that of Pompeii at the time of the AD 79 eruption, with 62.97 ha within the walls; Andrew WALLACE-HADRILL (1994, 91-117) estimated this at 11,000-11,500 inhabitants, and Miko FLOHR (2017, 68) at 7,250-11,750, or perhaps 7,500-13,500, if the suburbs are included. It has been argued that a new inscription of not long before the eruption implies a population of about 30,000 (OSANNA 2018), but there are dissenting opinions, which could reconcile the new inscription with previous estimates (BODEL *et al.* 2019).

It is characteristic of Campania that many towns did not strike their own coins, in precious metal or in bronze. Even Capua – after Rome, the second largest town in peninsular Italy, and perhaps the richest – did not coin in its own name until it defected to Hannibal in 216 (HNI, 64); it is signif-

icant that a city of this size and wealth did not feel an earlier need for its own coin.

In the late 5th and early 4th centuries, Neapolis struck silver didrachms for a number of Samnite communities: Allifae, the Campani, the Fenserni, the Hurietes, Nola and Phistelia (TERMEER 2016, 188, tab. 1); dies shared between Cumae and Neapolis show that these coinages were minted in Neapolis (RUTTER 1986, 88-93; 1997, 76), perhaps with silver brought home by Campanian mercenaries (RUTTER 1979, 99-100; TERMEER 2016, n. to 166-167; CMRR, 27).

The early ubiquity of Neapolitan bronze throughout the area is evident from the group of coordinated issues by Rome's colonies and Italian allies soon before and at the time of the First Punic War (264-241) that are shown in Fig. 2. These use the standard Neapolitan types: head of Apollo / man-faced bull (TERMEER 2019, 62, tab. 3.1). Despite the common types, the independence of these cities is shown by ethnics in their local languages and scripts: by HNI reference, Neapolis 582 and 589, Nola 607, and Larinum 622, Greek; Cales 436, Suessa 450, and Aesernia 431, Latin; Teanum 454 and 455, and Compulteria 437, Oscan. Neapolis itself struck its most copious issues ever at this time: HNI 582 accounts for 16.4 % of all coins made, and HNI 589 for 29.7 %, on the basis of Taliencio's corpus, for which see Fig. 3.

Marleen TERMEER (2019, 68-69) argues that these coinages were struck because allied cities and colonies were obliged to provide troops for the Roman army, and pay them; she suggests that military officials in the various communities were responsible for arranging production of the coins, in local mints, or in a central or travelling mint; Fig. 2, 1-3, dates to before 270, and the flying Victory types to the war proper.

Many of the cities (not Neapolis) also struck bronze with other shared types: a helmeted head of Minerva / cock and a Latin legend, as well as issues with local types. Neapolis, Cales, Teanum, Suessa, and Nola also struck silver. The clear reliance on Neapolitan types, and perhaps the Neapolitan mint, shows how widespread the use of Neapolitan bronze coin was in Campania. The area in which they circulated reached as far south as Pompeii, because there is a votive deposit in *Regio* VII, 8, 1f, of 134 bronzes, almost all Neapolitan, as well as three small Neapolitan silver diobols – all now lost – from the platea in front of the temple of Jupiter in the Forum; Rosa VITALE (2015, 389-392; listed by Taliencio's periods) dates this to the First Punic War, and notes that it does not contain Roman coins. The coins had been burned in a fire, and were extremely difficult to identify, but Amedeo Maiuri reported that the group contained a few Neapolitan pieces struck before 300, with the forepart of a man-faced bull (Taliencio's periods I, I-II and II); a majority of pieces with Nike crowning the man-faced bull (Taliencio period III, HNI 589 and 590); and, because of the condition



▲ Fig. 2. Coordinated military issues with Neapolitan types, of before and during the First Punic War.

1 Neapolis, HNI 582; 2 Cales, HNI 436; 3 Teanum Sidicinum, HNI 454; 4 Neapolis, HNI 589; 5 Cales (HNI does not list Cales with Nike above); 6 Teanum Sidicinum, HNI 455; 7 Aesernia, HNI 431; 8 Compulteria, HNI 437; 9 Suessa Aurunca, HNI 450; 10 Caiatia (HNI 58, n. to 433, suggests this is misread Compulteria, but the legend on this specimen confirms the attribution to Caiatia); 11 Nola, HNI 607; 12 Phistelia, HNI –, *FIORELLI* 1870, 708; 13 Larinum, HNI 622. Scale 1:1.

of the coins, it is probable that some were in fact the preceding issue, before Nike was added (HNI 582 and 584); as well as a few helmeted head of Minerva / cock coins, one identifiable as from Cales (MAURI 1942, 308). Fabrizio PESANDO (2006, 41) has suggested that this deposit was an offering made during a ritual by which a Samnite *legio linteata* was enrolled for the war.

Tab. 1, which uses information assembled by Rosa Vitale about finds of Neapolitan bronze from a number of *Regiones*, shows that Pompeii used Neapolitan bronze at an early date, from the time it was first issued, and well before its alliance with Rome, because the relative numbers of coins in each period do not stray far from the relative sizes of the different Neapolitan bronze issues in Taliercio's corpus; this suggests that Pompeii was receiving Neapolitan coin at a more or less constant rate between ca. 350 and ca. 225, when Neapolitan coinage stopped. (There are differences in the dates given by Taliercio and by Rutter in HNI for Neapolitan bronze; Taliercio begins production in ca. 330; for simplicity, I give Rutter's dates, even when citing Taliercio in Tab. 1 and Fig. 3, and in the text.)

Despite Minturnae being a Roman colony, and in the far north of the area we are considering, it also used Neapolitan bronze coin before the Second Punic War. Over the years, I have assembled a database of non-Roman coins from the River Garig-

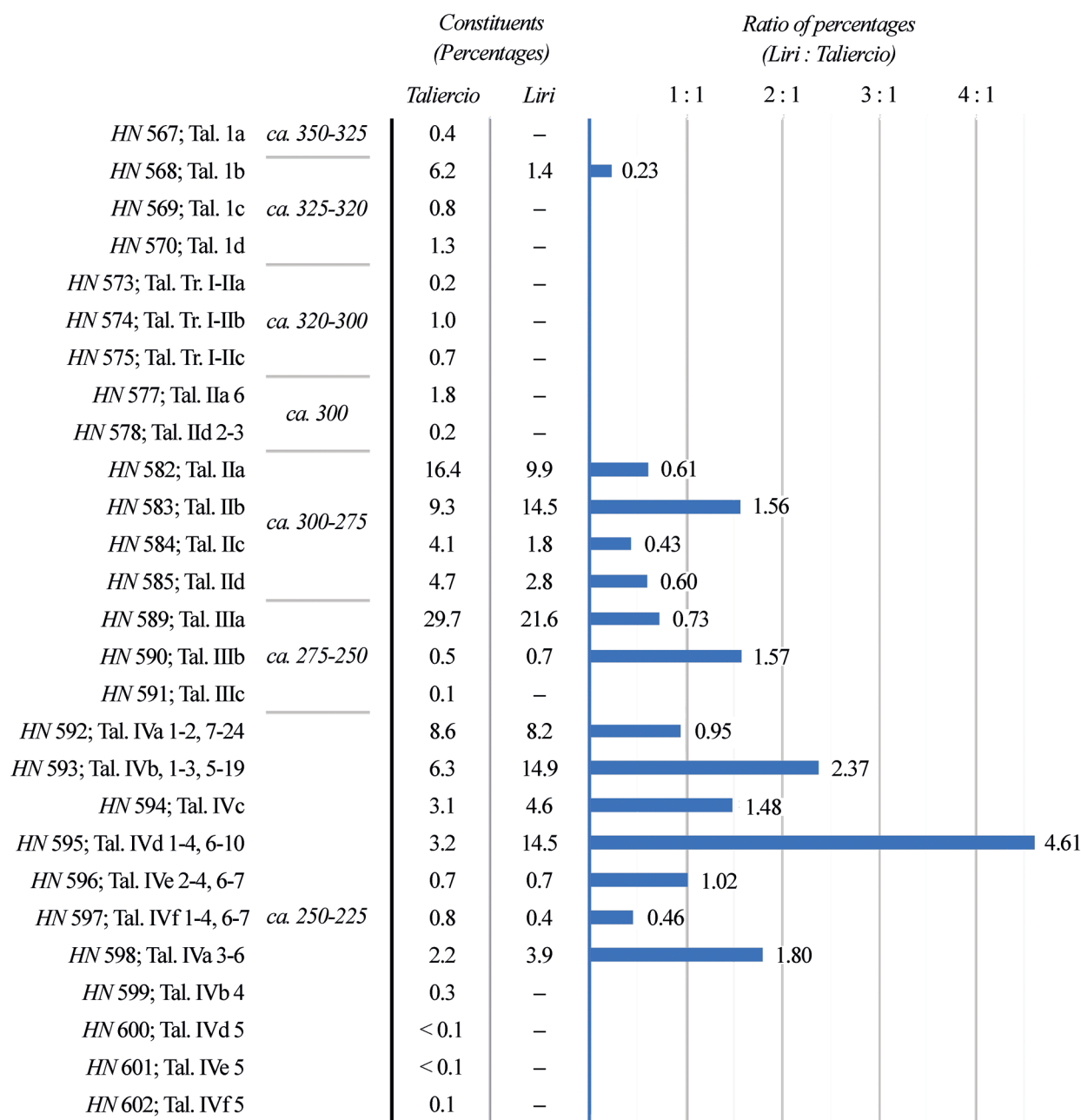
liano (the ancient *Liris*) at Minturnae (for the 'Liri database': STANNARD/RANUCCI 2016, 158-161); Neapolis is the commonest single mint in the Liri database, about 12.6 % of all coins. Fig. 3 compares the relative frequencies of coins of the various issues in Taliercio's corpus with those in the Liri database: the pattern is similar to that at Pompeii, with the exception that coins from before the planting of the colony in 296/295 are almost absent; but while the issues from ca. 300 to ca. 250 (Taliercio's periods II and III) are present in about the same proportions in which Neapolis struck them, the issues of ca. 250-225 (Taliercio's period IV) are relatively more common. One issue, HNI 595, is particularly common – 4.61 times as frequent – and I suspect that a block of these coins was fetched from Neapolis to provide small change for the market.

A sizeable number of the coordinated military types reached Minturnae (Tab. 2). Cales is the commonest, and Minturnae was its port. As a *colonia maritima* founded before 200, Minturnae itself probably was not under an obligation to provide soldiers to the legions (SALMON 1955, 66-68), which may be why it did not itself strike on this occasion.

Pompei and Minturnae show that Campania before the Second Punic War had, in effect, become a Neapolitan bronze currency zone. It is worth thinking how this came about, when its cities were separate polities and their markets largely

► *Tab. 1. Neapolitan bronze coins from Regiones I, VI, VII, VIII & IX (VITALE 2015, 133, n. 6-7. The coins from the votive deposit in Regio VII 8, I, f, are not included. The parts of all Neapolitan issues are calculated from the corpus in TALIERCIO 1986, n = 2439).*

Neapolis, Taliercio		Part of all Neapolitan issues	Regio VII (excavations) n = 30	Regiones I, VI, VIII, IX (excavations) n = 38	Regiones I, VI, VIII, IX (ad 79 level) n = 15
I & I-II	ca. 350-ca. 300	10.4 %	6 %	5 %	20 %
II	ca. 300	35.5 %	59 %	43 %	27 %
III	ca. 300-ca. 250	29.4 %	16 %	16 %	13 %
IV	ca. 250-ca. 225	24.6 %	16 %	27 %	33 %
Uncertain			3 %	5 %	7 %



▲ *Fig. 3. Frequencies of Neapolitan issues in Taliercio's corpus (n = 2439) and in the Liri Database (n = 293) (STANNARD 2018b, 102, updated).*

independent of each other; where Neapolis was not the largest city and had no political hegemony over the others; and when bronze was largely immobile. While we can explain this as evolving from a situation where incoming Samnite tribes – unlike the economically more complex Greek cities – were not initially coin-users, but this does not

supply the actual mechanism by which Neapolitan bronze spread throughout Campania in the 4th and 3rd centuries. Some coins will have moved casually with travellers, some with soldiers on campaign and coming home, but I think that someone – perhaps local magistrates and elites, or simply traders in need of small change – must deliberately have fetched

blocks of coin from Neapolis. The huge bronze production of the Neapolitan mint is explicable, then, not as responding primarily to its own local market, but to the practice of other Campanians regularly bringing in silver or valuables, and taking away Neapolitan token bronze. Their willingness to acquire fiat coin at face value was because of the utility of these coins in facilitating exchange in the local markets to which they were taken, and – because Neapolitan bronze had, in effect, become a pan-Campanian currency – at the face value at which they had been acquired. Neapolis, for its part, profited by the difference between face value and production cost for every piece taken away, though I doubt that there was a deliberate policy to this end.

How common are Roman bronze coins at Minturnae?

Rome based its monetary system before the Second Punic War on a heavy cast bronze coinage, of full or near full metal value, which it used to pay its troops. It also struck silver didrachms, in particular for use outside its home currency area, and after the First Punic War, made some token bronze, but these issues were discontinued before the didrachm coinage ended; as Crawford remarks, struck bronze appears to have been fundamentally alien to the Roman coinage system at this time (CMRR, 41).

It is often held – with neither literary nor empirical evidence – that, ‘as Roman rule progressed, it imposed its own domestic monetary standards on its Italian dominions and allies, leading to the disappearance of the [Greek] token system. By the second third of the 3rd century BC, the Roman sub-libral and then semilibral system was used in most of Italy’ (BRANSBOURG 2011, 100); we can test this with the evidence of the coins found at Minturnae and at Pompeii, and show that it is not the case.

Underwater investigations by Dominic RUEGG (1995, 9) recovered 4,918 coins from the area of the bridge over the Garigliano (the ancient *Liris*) at Minturnae; the coins were, in all probability, tossed into the water by travellers passing over the bridge, from the time of its construction, probably about the middle of the 3rd century, to the late Empire. Of these, 462 are Republican bonzes (380 whole and 82 halved), as catalogued by Fiorenzo CATALLI (1998). Tab. 3 re-analyses his catalogue, distinguishing coins merely listed from coins illustrated, as a considerable number have been reattributed; the information in the ‘coins listed’ column is therefore approximative, because of the lack of images.

We must be cautious. Although the deposit includes coins dating from the foundation of the city at the beginning of the 3rd century until well into imperial times, it is unlikely that the rate at which coins entered the river was stable; nor can the date

	HNI	Neapolitan types	Athena/Cock	Local types
Uncertain, shared types		3	-	-
Latium Aquinum	432	-	1	-
Samnium, Aesernia	431	1	-	-
	436	20	-	-
Campania, Cales	435	-	12	-
Campania, Compulteria	437	5	-	-
Campania, Suessa Aurunca	449	5	3	2
Total		34	16	2

of issue of the coins be mechanically linked to the date at which they were thrown in. Moreover, the presence of Neapolitan and related issues in the Liri database (Tab. 1-2) cannot be directly compared to the Roman coins from Ruegg’s investigations, because the samples are discrete and separate, and because I did not try to include Roman bronze in assembling the Liri database.

Nonetheless, Tab. 3 shows that Roman bronzes did not reach Campania in large numbers before the Second Punic War; there are only four earlier coins. Although a Roman colony, Minturnae was drawn into the sophisticated and monetized economy of Campania, and relied on token Neapolitan bronze; Rome made no effort to supply small change.

▲ Tab. 2. *Coins of the Campanian military issues during the First Punic War at Minturnae (Liri database).*

▼ Tab. 3. *Roman Republican bronze coins from the River Garigliano at Minturnae (CATALLI 1998, with my reattributions).*

RRC	Date	Coins listed		Coins illustrated	
		Whole	Cut	Whole	Cut
Pre-Second Punic War	> 226	4	-	4	-
38/5-7; 39/5; 41/10	217-212	22	-	22	-
56/2, <i>asses</i>	< 211	128	79	63	5
56/3, <i>semisses</i>		13	2	10	-
56/4, <i>trientes</i>		5	1	3	1
56/5, <i>quadrantes</i>		5	-	3	-
56/6, <i>sextantes</i>		7	-	6	-
56/7, <i>unciae</i>		2	-	-	-
60/6, 61/6, 72/9, 110/2, 119/5	211-195	9	-	7	-
Minturnae, Second Punic War	204 > 201?				
<i>trientes</i>		24	-	14	-
<i>quadrantes</i>		31	-	8	-
<i>sextantes</i>		39	-	17	-
Post-Second Punic War	189-170	3	-	3	-
	169-158	9	-	8	-
	153-146	6	-	6	-
	138-86	12	-	12	-
Anonymous imitative <i>quadrantes</i>	90s	10	-	10	-
Latin pseudo-mints	70-50?	1	-	1	-
Uncertain with prow		14	-	-	-
Illegible		36	-	-	-
Total		380	82	197	6

A first impression of Tab. 3 might suggest that *asses* of the Second Punic War reached Minturnae in considerable numbers. Although Catalli lists them all as RRC 56/6, < 211, they certainly include unreadable coins of issues down to the end of the period of large-scale *as* issues, in 146. But, going by the illustrations – which are the better-preserved pieces – all these *asses* are exceedingly worn, more so than the other coins. Their universally awful condition, the fact that there are disproportionately fewer examples of the lesser denominations that should have accompanied the *asses*, as well as the very large number of cut *asses* – a practice that seems to have begun about the end of the 2nd century, and then grown in frequency – suggests that the large majority of the *asses* came to Minturnae in worn condition at a late date, perhaps towards the end of the Republic, even in the early empire, so that their presence does not reflect the monetary situation during the war. Suzanne FREY-KUPPER and I (2018, 309-320) have shown how such abysmally worn pieces were still available to be sent from Rome in considerable numbers to military camps north of the Alps in the second quarter of the 1st century AD.

The war was a watershed that dislocated the old political and economic structures of Campania. Because of the immense military effort and financial strain, the Roman coinage system came to pieces. After debasement of the silver *quadrigatus*, and a series of reductions in the weight of the bronze coinage, now struck rather than cast, a new system based on the *denarius* was created in 212 or 211 (CMRR, 58-60), which for the first time fully integrated Rome's bronze and silver issues. The copious wartime bronzes were used by armies in all theatres of war. Roman bronze is never again as frequent in the Garigliano deposit.

itself during the war. I recently showed (STANNARD 2018b) that 36.6 % of HNI 595 in Fig. 3 were 'chopped' (like Fig. 4,1-4), probably for some monetary manipulation, and that coins of this issue were overstruck with Romal sextantal types (Fig. 4,5-8; Fig. 4,6 is over a chopped coin). These *sextantes* must have been made, at the latest, before 191, because Livy (XXXVI,37) reports that lightning struck the small shops around the Temple of Jupiter in that year, which then burned, and this is where a hoard with *sextantes* of this type was found (RRCH 98; NEWELL 1933, pl. II,29).

I at first thought that these *sextantes* were a strictly local imitative issue, made *after* the war, but now think that they were struck *during* the war, when a large number of mints – some in military camps in Sicily and Apulia (McCABE 2017) – many of which had never struck before and would never strike again, coined for both Rome and Hannibal, in a period of monetary chaos. Minturnae – an important naval base, which also controlled land access across the *Liris* from Latium to Campania – would have been a key military asset in the struggle to retake Capua from Hannibal, as well as a stage on the sea-route to Sicily and North Africa.

Alejandro Sinner and I have recently concluded that the role of Minturnae in the economy and trade of the 2nd and 1st centuries has been underestimated (STANNARD *et al.* 2019). The possibility that coins of any sort were struck there during the Second Punic War has been overlooked, because there is no earlier coinage in its name, including in the period of the coordinated military issues with Neapolitan types during the First Punic War, but, as noted earlier, this is probably because, with the status of a *colonia maritima*, Minturnae did not have to provide troops to the Roman legions, and so a need to make coins to pay them.

These *sextantes* are very common at Minturnae (they are listed in Tab. 3, 'Minturnae, Second Punic War'). I therefore systematically ran through illustrations of Republican bronzes that have appeared in commerce, collecting those with a river patina, because the Garigliano was by far the most important source of such coins during the late 20th century.

▼ Fig. 4. 'Chopped' Neapolitan coins (HNI 595) from Minturnae, and Minturnae *sextantes* struck over this coin. Scale 1:1.

An emission of Roman bronze coins at Minturnae during the Second Punic War

It is now possible to prove that an emission of Roman bronze coins was made at Minturnae



ry, including to investigate whether other denominations were also made. Patina is a weak criterion for provenance, if one or only a handful of coins are involved, but when many coins of a particular issue all have the same patina, and when there are only a few of the same issue with other patinas, it is significant. Moreover, there are many die-links among

the coins published by Catalli and the coins from trade, as well as with coins that I had recorded in assembling the Liri database. Andrew McCabe also kindly gave me his archives, which include both river- and non-river patina coins.

This emission comprises three denominations: *triens*, *quadrans* and *sextans*. Fig. 5 illustrates

▼ Fig. 5. Examples of *triens* of the Second Punic War issue at Minturnae. Scale 1:1.





▲ Fig. 6. Examples of *quadrantes* of the Second Punic War issue at Minturnae. Scale 1:1.

examples of the *trientes* that I attribute to Minturnae. This is not an exhaustive catalogue of styles or dies, but aims to justify my attribution. The evidence is strong: the die-linking of river patina coins from auctions with coins of certain provenance to Minturnae (Fig. 5,1.4), and the many specimens that share a die or dies (Fig. 5,1-5.7-12). Note the much cruder dies of Fig. 5,19-24.

Although *quadrantes* are the least common of the three denominations, there is a similar die-linking of coins of Minturnae provenance (Fig. 6,1.3) to river-patina coins, and a similar frequency of shared dies. Once again, there are some very rudimentary dies (Fig. 6,14-16), in addition to those of good style.

The many *sextantes* struck over Neapolis HNI 595 (Fig. 4,4-8) place the issue at Minturnae. There are ten coins with certain Minturnae provenances in Fig. 7, and one of the chopped pieces (Fig. 7,6 = Fig. 4,5) is die-linked to one of these. There are many shared dies, and, as with the *trientes* and *quadrantes*, a number of crude dies, associated with smaller and lighter flans (Fig. 7,29-36).

The three denominations are obviously part of a single emission. There is strong stylistic unity in the most attractive and best-engraved obverse dies in the three denominations. Among the *sextantes*, there is wider stylistic diversity than in the other denominations, and some obverse dies are very poor (Fig. 7,29-36). Reverses are often rather rudimentary, and include a die with the R of ROMA reversed (Fig. 7,7-8), and, on some dies (most spectacularly Fig. 7,20.24), the engraver has struggled to keep the legend in the field, staggering the letters down to the left; Fig. 5,14, is a similar *trients*.

Perhaps the initial dies in all three denominations came from Rome and further dies were prepared by local die-sinkers, and it is probable the coins of poorer style were in fact not struck during the war, but later in the 2nd century, as the need for fresh small change became more and more pressing.

Andrew McCABE and Jordan MONTGOMERY (2020) have recently reviewed the Rome over Rome bronze overstrikes of the Second Punic War period, in order to see if these bear out to the supposed practice of overstriking earlier issues with the types of a higher-value denomination of a subsequent issue, as part of a systematic series of revaluations of the *as* and its divisional units. This is the received opinion, but they show that the evidence of the different denominational combinations amongst contemporaneous overstrikes does not, in fact, support the supposition; for example, there are post-semilibral *sextantes* and *trientes* overstruck on the same semilibral *sextans* issue, and two sextantal *asses* that share dies, one overstruck on a semilibral *sextans* and the other on a semilibral *triens*. This is, of course, not the same as saying that a mint did not work towards a certain average size and weight for its coins, only that such coins were token issues, and a countable currency, the value of which was not directly related to metal content.

This is the case of the Minturnae issues. Tab. 4 shows that no denomination appears to use a weight-standard that relates directly to a specific duodecimal fraction of the Roman pound of ca. 324 g, and the stepped reductions that occurred during the war; a theoretical uncial *as* weight would be 27 g, and a semuncial standard 13.5 g. I do not



▲ Fig. 7. Examples of *sextantes* of the Second Punic War issue at Minturnae. Scale 1:1.

◀ Tab. 4. Weights of the Minturnae issue.

think that this can be explained by regarding these issues as non-official, or provincial; I consider them official coin, made by Roman authorities – probably metropolitan – at Minturnae, to support the war effort in upper Campania, and on the sea.

To understand the evolution of Rome's bronze coinage in the 2nd and early 1st centuries, we need to begin from the fact that its heavy, cast bronze of the 3rd century was *not* small change, but the ref-

erence coin, money directly tied to metal value by weight. This coloured Roman thinking in the series of stepped fractional weight reductions that led to

	N	Average	Std dev	Theoretical As weight
<i>Trientes</i>	47	5.96 g	1.42 g	17.88 g
<i>Quadrantes</i>	24	4.44 g	1.24 g	17.76 g
<i>Sextantes</i>	57	2.32 g	0.67 g	13.92 g



▲ Fig. 8. Sardinian anonymous *sextantes*, struck over SNG COP. 42, 387-388, dated by VISONÀ (2013) to 241-238. Scale 1:1.

an articulated coinage system, based on the copious *denarius*, where silver became the reference, and bronze pragmatically declined in weight into a token coinage, albeit a weighty one. Bimetallic money is inherently unstable, but I doubt that one can simply explain the evolution of Rome's bronze in the 2nd century by reference to metal weight and price.

The role of overstrikes in understanding the Minturnean issues

These 'half-weight' issues were subsumed by Crawford under his RRC 56. Previous discussion of them has focused on overstrikes. In other theatres of the war, large numbers of captured coins were systematically restruck. There were, for example, three signed issues in Sardinia over Sardo-Punic coins (RRC 63/6 C, 64/6 MA, 65/6 AVR); while RRC 42/2, *quadrans* and 42/3, *sextans*, first corn-ear issue, Sicily, are very largely struck over captured Syracusan coins of Hieron II, with the trident reverse. The purpose of the Minturnean issues, however, was not to restrick coins captured in the war, and a focus on overstrikes obscures this; one must start from the fact that, while there are overstrikes in all three denominations, the great majority of coins are on fresh flans.

Roberto Russo correctly isolated the three denominations of the Minturnean issue as an anonymous light series not identified by Crawford, but believed that 'the coins in this series are always overstruck and almost always on Sardo-Punic coins' (RUSSO/DE FALCO 2013, 86, n. to no. 207). I have, however, not been able to find a single example of the Minturnean issues over a Sardo-Punic coin. There are indeed a few anonymous *sextantes* over the Sardo-Punic issue, SNG COP. 42, 387-388 (head of Tanit left/bull right, star above) (Fig. 8,3), which are not listed specifically in RRC; these seem stylistically close to RRC 63/6 C, 64/6 MA, 65/6 AVR, which most often overstrike this coin, and I do not think they are part of the Minturnean issue. I know only two (Fig. 8).

Antonio (MORELLO 2007, 19-21) (here Fig. 4,7) also brought together many of the elements of the Minturnean issues, when he published the first known *sextans* over Neapolis HNI 595, which I had brought to his attention. He correctly reattributed a *sextans* over Carthage, SNG COP. 42, 109-119, which Crawford had erroneously listed as RRC 63/6, to the same issue; noted that the Sardinian issues were of a different style; and drew attention both to the many *sextantes* from Minturnae published by Catalli, and to the *sextans* of the same type from excavations there published by Newell. He also illustrated examples of the three Minturnean denominations. He noted that the *sextans* was known to be struck over both Neapolis and Carthage, but – believing that overstruck coins were almost invari-

ably made in the area where the coins overstruck came from – he made no definite mint attribution, but placed these issues generally in a mint somewhere in Campania, probably northern Campania; I have here shown that in everything he was right, except that he was unable to take this final step.

MCCABE (2013, 79-83), in his study of Roman anonymous bronzes, then recognised that there were Italian, Sicilian, and earlier Roman under-types among anonymous overstruck bronzes of the Second Punic War, and suggested they were made in a number of mints in Sardinia, southern Italy and Sicily. He classed them together in his portman-teau Group H1, described as light-weight coins of the period of official style, struck over captured enemy bronzes. He illustrates some Minturnean *sextantes* (82, H1.Sx.5-7), as well as some that are not Minturnean, struck over Siculo-Punic coins (79, H1.Sx.2-4); he did not, however, attempt to split out the different mints, and was misled by Russo into believing that many of the overstruck coins were Sardinian.

In Fig. 8, I illustrate examples of the Minturnean issues over Neapolis, Rome, Syracuse, and Carthage, to add to the four *sextantes* over HNI 595 in Fig. 4. The fact that different mints were overstruck within one and the same emission has confused earlier scholarship, because it led to attempts to decide where individual coins were made on the basis their individual undertypes. This hindered understanding of the emission as a whole, and the realisation that it had overstruck the coins of a number of different mints. Moreover, until I had shown that Minturnae used Neapolitan rather than Roman coin before the Second Punic War, there was no reason to think that the few known overstrikes on Neapolis were made in Minturnae rather than in or near Neapolis.

Some Neapolitan coins older than HNI 595 were also re-used as flans: Fig. 9,1 is a *triens* over HNI 582, of ca. 300-275 (A), and 2 a *sextans* over HNI 574, of ca. 320-300 (B). Earlier Roman issues were overstruck by the *trientes* 3 and 4 (probably over RRC 39/4, *uncia*, ca. 217-215), while 5 and 6 are struck on Syracusan coins captured with Rome's sack of the city in 212 (C), and often overstruck in Sicily by RRC 42/3. Finally, 7-12 are over Carthaginian coins. These include issues that had already dropped out of circulation in Sicily after the end of the First Punic War in 241 (FREY-KUPPER 2013, 181, 315-316, 709-710): the *sextantes*, 8, over SNG COP. 42, 109-119, from the mint of Carthage, of ca. 320-290/280 (E), and 9, over SNG COP. 42, 126-127, from an uncertain mint of the early 3rd century (F). They also include contemporary issues: the *quadrans*, 7, over SNG COP. 42, 302-324, of the mint of Carthage, of ca. 221-210 (D), and the *sextantes*, 10-12, all over SNG COP. 42, 397-398, of ca. 208-202 (G) (Fig. 9).

The mints overstruck show the important maritime role that Minturnae must have played on the



sea-route to Sicily and Africa, because the Sicilian and Carthaginian coins are unlikely to have reached the city by land. Paolo Visonà has remarked to me that in North Africa – particularly at Carthage – older Carthaginian issues, like Fig. 9,E-F, continued to circulate until the first half of the 2nd century, as shown by stratified finds from the French excavations at Byrsa listed in LANCEL (1979), but still unpublished; North Africa, rather than Sicily, is the only region where these coins could still be found

around or after 200; moreover, his 1985 database of 2,619 Punic bronze coins from Sicily did not include a single specimen of SNG COP. 42, 397-398, while I have already identified three *sextantes* (Fig. 9,10-12) over this rare issue, which makes it is highly likely that the coins came from Africa; and the reverse die-link between Fig. 9,10-11 suggests they arrived in some numbers and were struck together as a block. The late date of this issue, and the fact that Scipio invaded Africa in 204, suggests a date late in the war

▲ Fig. 9. Overstrikes on Neapolis, Rome, Syracuse, and Carthage. Scale 1:1.

for the Minturnean issues, say *ca.* 204 to 201. They have in the past been considered specimens of RRC 56; in order to distinguish them clearly, I propose now designating the *trientes*, *quadrantes* and *sextantes* as RRC 56M/4-6, respectively.

The response to the crisis of small change at Minturnae after the Second Punic War

Successful warfare in the first half of the 2nd century, in which Rome's allies participated, brought huge wealth to west-central Italy. Between 201 and 152, Rome received 27,280 talents in indemnities (equivalent to 630 t of silver), and the value of booty between 200 and 157 has been estimated at 18,250 talents, for a total income from war of nearly 46,000 talents, or 1,050 t of silver (KAY 2014, 42). From the middle of the 2nd century to about 50, successful warfare drained the economic resources of the Mediterranean towards west-central Italy, and the Roman economy grew fastest, at any time in either the Republic or the Empire (KAY 2014, 103-104).

The Roman conquest of Spain also created new trading opportunities that enriched Minturnae, Pompeii, and all west-central Italy. Vast new economic opportunities opened up with the exploitation, largely by Campanians, of Spain's metal and other resources, and the development of the capacity to produce and export large quantities of Italian wine and oil to Rome, Gaul and Spain. Imperialism fostered

long-distance trade with the Greek East, Gaul, Spain and Punic Africa (WOOLF 1993). *Gentes* and their freedmen from southern Latium and Campania settled abroad and managed contacts with Italy and local redistribution networks (STEFANILE 2017a; 2017b; STANNARD *et al.* 2019). Minturnae found itself in a commercially most advantageous situation. In the 2nd and 1st centuries, it traded extensively with *Hispania Citerior* and *Ulterior*, including in Spanish lead, and in wine from the *ager Caecubus*, the *ager Falernus*, and its own vineyards, in an arc from Massalia through Gaul right along the Spanish coast, and up the river *Baetis* (Guadalquivir). Black gloss fine table-ware from Cales travelled with the wine as secondary cargo, from the late 2nd century, and are found throughout these areas (PRINCIPAL/RIBERA I LACOMBA 2013; STANNARD/SINNER 2014; 2016; STANNARD *et al.* 2019; for the supporting archaeometric data, see MADRID I FERNÁNDEZ/SINNER 2019).

By the end of the war, Minturnae had switched to Roman denominations, and acquired a stock of Roman bronze. However, in these favourable economic circumstances, its markets needed much small change, and, as Tab. 3 shows, Roman bronze did arrive in any quantity. As the monetary stock wasted away without replenishment, the general crisis in the supply of small change throughout west-central Italy worsened, and the city fell back on various *ad hoc* solutions. As I suggested, these may include the cruder pieces in Fig. 5-7.

There is also a large group of anonymous imitative *quadrantes* that reproduce the style of money-

▼ Fig. 10. Roman-style *quadrantes* probably made at Minturnae in the 90s, of which 9-14 are from the Republican Bathhouse at Regio VIII 5.36 in Pompeii. Scale 1:1.



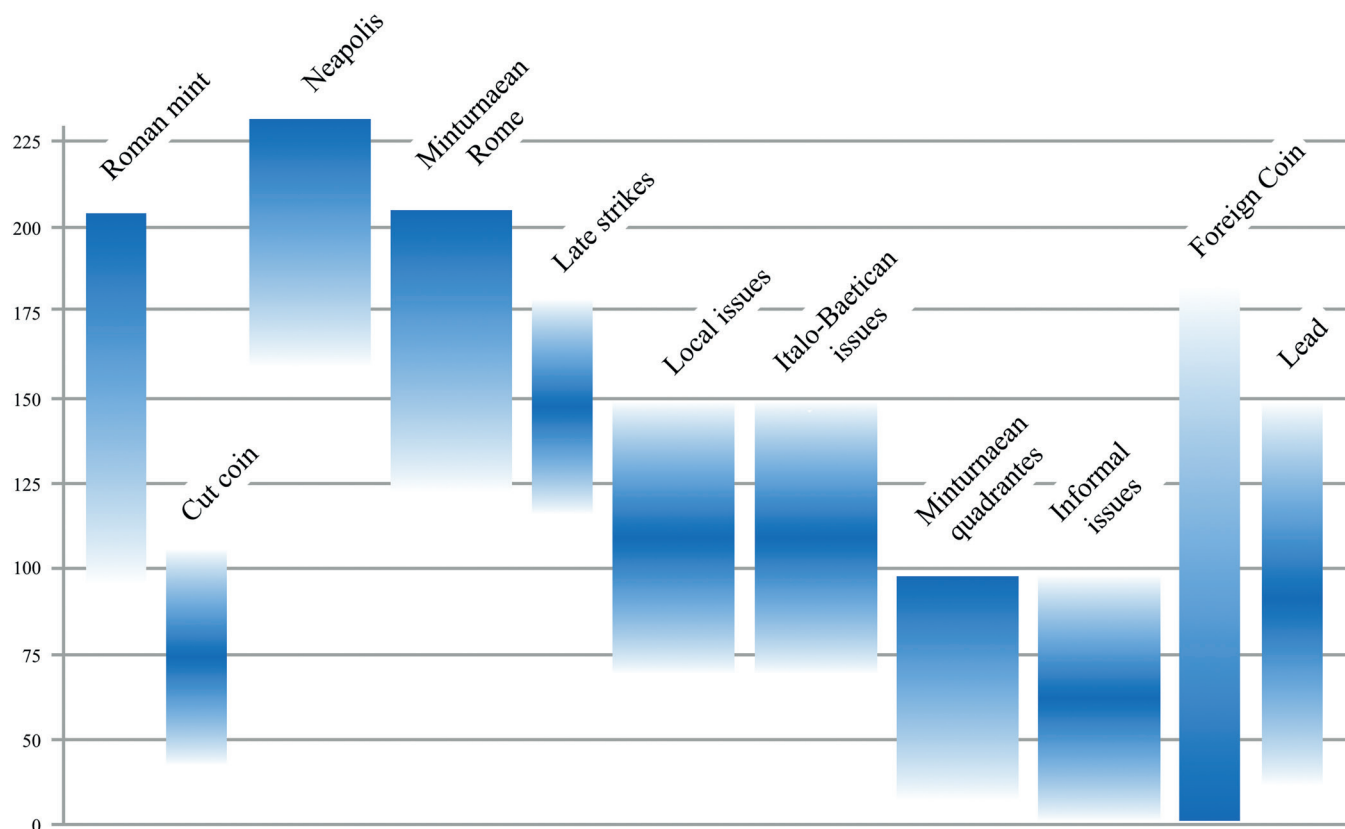
ers' *quadrantes* of the late 2nd century, when they are not very crude (Tab. 3; Fig. 10): they are common at Minturnae and were probably made there. (Catalli listed such pieces as RRC 56/5 & 352/2.) MORELLO (2007, 20) has correctly described them as imitative coins of the 1st century, but without attribution to Minturnae. McCabe includes them in his Group M, 'semuncial issues of the Social war and era of Sulla and Cinna', classing together RRC 339 (prow right) and 350B (prow left). Crawford himself felt that the lower denominations of RRC 339 might well be unofficial imitations (RRC, 340). The left-facing prows suggest a date in the 90s. There are six in the purse-hoard from the Republican Bathhouse at *Regio VIII* 5.36 in Pompeii, which suggests they arrived there before the Social War (91-88) (STANNARD 2019).

Unlike the coins of RRC 56M, I do not think these coins official, in the sense that they were made at the express behest of metropolitan authorities, rather that they are *ad hoc* local coinages made in the context of the crisis of small change that affected all central Italy at that time. Their value derived from utility rather than fiat. To distinguish them, I propose citing them as RRC 339M/4. There are also a number of similar *quadrantes* with symbols and letters that CRAWFORD (1982) gathered together, largely from the drawings in AILLY 1864-1869; many of the cruder pieces he lists are not Minturnae, but coins of the Latin pseudo-mints (STANNARD/CARBONE 2013, groups 9-16; STANNARD 2018a, 119); however, I have seen others of

these pieces with river patinas, of the same style and fabric as RRC 339M/4, and think they were also probably made at Minturnae. Further research is needed.

There are also a number of anonymous issues of various denominations and styles that must be local coinages of the city (Fig. 12,1-10), whether made by city officials or not; some of these (Fig. 12,1,3-4, with the strigils and *aryballos*) use the distinctive types of the Italo-Baetic series (STANNARD 2018a, 19-38); while some *quadrantes* (Fig. 12,11-12) are struck on the characteristic triangular flan often used in these issues (STANNARD 2013c). Coins were also cut into pieces, usually halves, to provide lower denominations. Many coins of the Italo-Baetic issues, made between, say, the 130s/120s and the 70s (examples are Fig. 12,15-20), which were probably made in a commercial milieu in Latium (STANNARD 2020) – perhaps in Rome itself – also reached Minturnae, in particular the very copious Dionysus/panther type (Fig. 12,19-20), which was probably used for a military *sitarion* (STANNARD 2018a, 122-129, 152-154; cf. PSOMA 2009). There are also lead issues, some with marks of value, probably made by commercial *societates* (Fig. 12,13-14) (STANNARD *et al.* 2019, 150-157). The coin listed as 'Latin pseudo-mint' in Tab. 4 is of the copious issues of the mid-1st century pseudo-mints that imitated a number of foreign mints and Rome: Fig. 12,21, Panormus, in Sicily; 22, Paestum in Lucania; 23, Menaion in Sicily; and 24, Termessus

▼ Fig. 11. Constituents of the coin stock at Minturnae, from the closure of the Neapolitan mint to the end of the Republic.





▲ Fig. 12. *Non-state small change at Minturnae in the 2nd and 1st centuries. Scale 1:1.*

in Pisidia (STANNARD/FREY-KUPPER 2008; STANNARD/CARBONE 2013); other examples from Ruegg's investigations are VISMARA (1998, 120-129, 152-154); there are many in the Liri database.

In all the congeries of non-state coinages that characterises west-central Italy from the mid-2nd century to the time of Augustus, there is no sign of an attempt to match face-value (when this is clear) and intrinsic metal-value. Nor were they issued by a polity capable of endowing them with fiat value. They functioned because of their utility and transactional values, in the context of an undersupply of small change. This is true not only for Campania, but for the informal coinages of Latium and Rome itself.

The response to the crisis of small change at Pompeii after the Second Punic War

As at Minturnae, the aftermath of the Second Punic War ushered in a time of expansion and great wealth at Pompeii. As an ally, the city's troops marched with Rome, and seem to have been pres-

ent at the sack of Corinth in 146, because Lucius Mummius, the conquering general, dedicated a statue of Apollo from the spoils in the temple of Apollo in Pompeii (MARTELLI 2002; YARROW 2006, 63-64). Like Minturnae, Pompeii developed a vast wine industry, on the massively productive plains around Vesuvius. The territories of Neapolis, Nola and Pompeii were probably capable of producing something like 100 million litres of wine a year (and perhaps a third more in good years), equal to four times local demand (DE SIMONE 2017). Wine was more profitable than wheat, and the easy availability of grain from overseas, with the opening up of western Mediterranean trade, and from neighbouring regions, encouraged specialisation. War had brought a large number of slaves to Italy, making it possible for elites to change the structure of production towards agricultural commodities, and for the surplus labour liberated to be absorbed in non-agricultural sectors in growing towns (WALLACE-HADRILL 2008, 129-130; ERDKAMP 2016, 17). Massalia seems to have been a particularly important market for Pompeii, because a number

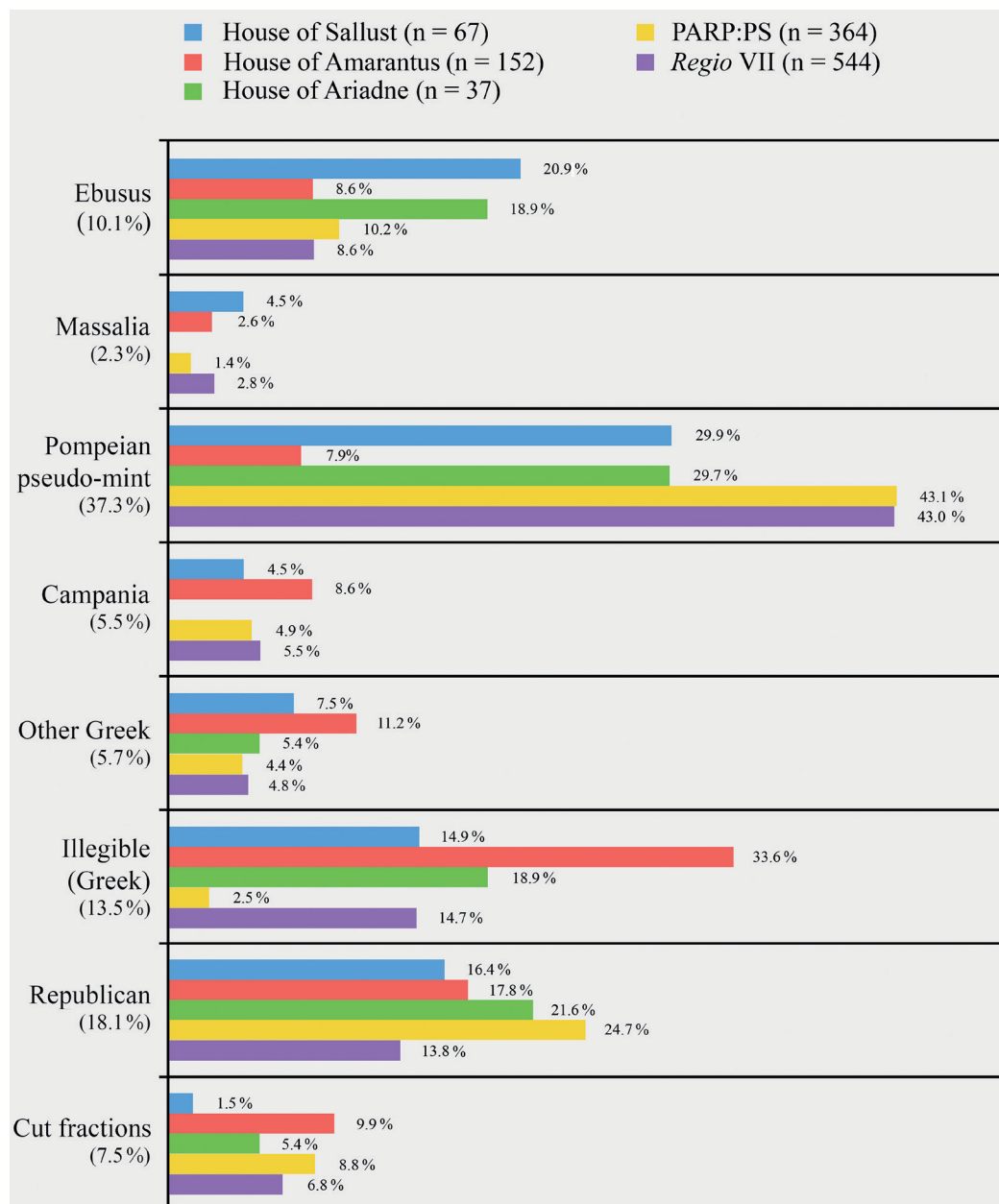


Fig. 13. Pre-Imperial bronze coins from below the AD 79 destruction level at Pompeii (percentages of each sample): the House of Sallust (Regio VI 2, 4: RANUCCI 2014, 1-69); the House of Amarantus (Regio VII 4, 51-31: STANNARD 2013b, 1-164); the House of Ariadne (Regio VII 9, 25 & Regio VII 4, 29: RIBERA I LACOMBA et al. 2013, no. 1-37); the Pompeii Archaeological Research Project: Porta Stabia (PARP:PS) excavations (Regio VI, 1: PARDINI 2011, Part II; and coins from excavations in Regio VII: VITALE 2015, 200, tab. 1(a)) (this reproduces STANNARD 2018a, 143, fig. 16).

of coins of the Pompeian pseudo-mint have been found nearby, in the area of l'Étang de Berre (STANNARD et al. 2016; 2018). It also traded into Spain: at Cabrera de Mar (Ilduro), abandoned as an urban centre between 80 and 70, most amphorae appear to have come from the Bay of Naples and Pompeii (STANNARD/SINNER 2014, 172-174). This period of wealth came to an end with Pompeii's revolt from Rome in the Social War, and its conquest by Sulla in 89.

Unlike Minturnae, Pompeii did not acquire new Roman small change during the Second Punic War, and few coins of the Minturnae emission reached Pompeii. It entered the 2nd century still dependent on its residual Neapolitan bronze stock, a wasting asset, as Neapolis had stopped coining both silver and bronze about 225; it is therefore not surprising that Pompeii appears to have been the first city, or

one of the first, to take extraordinary measures to find small change. Although the Roman *denarius* must have become the silver standard, and bronze must have functioned in relation to it, there is no sign that Pompeii adopted Roman bronze denominations.

Fig. 13 is a sample of 1,164 pre-Imperial bronze coins from a number of deep excavations in different parts of the city. Coins from all strata, up to the time of the AD 79 eruption, are included. It is clear that, as at Minturnae, Roman bronze coins of before the Second Punic War are rare; in the whole period, Republican coins account for only 18.1 %, and only 3.6 % of these are pre-*denarius*.

I earlier suggested that Campanian communities in the 3rd century deliberately imported blocks of Neapolitan bronze. In the same way, a huge block of coins was now brought from the Punic island

of Ebusus to Pompeii, probably around 150/140: 10.1 % of all pre-imperial bronze coins in Fig. 12 are from Ebusus. Most are CAMPO's (1976) group XVIII. The proof that is a block lies in comparing the relative numbers of coins of this group, as a part of all the Ebusan coins found in Ibiza itself (8.9 %), and in Italy (87 %). The immediately preceding group XII accounts for 10.8 % of the finds in Ibiza, in Italy for only 3.0 %, which suggests that the block was a sample of the coin stock in Ebusus towards the middle of the 1st century, or slightly later (STANNARD/FREY-KUPPER 2008; STANNARD 2013a; FREY-KUPPER/STANNARD 2018; 2019).

When even the imported coins proved insufficient, a pseudo-mint struck copiously between about 140 and the Social War. The most recent catalogue of its many issues is in FREY-KUPPER/STANNARD 2018, 337-343, app. 3; an earlier one in STANNARD 2013a, 147-153; for brevity, I shall not describe the pseudo-mint in detail here.

This coinage seems to have stopped being made with Sulla's conquest in 89. I have recently compared Massaliot coin from Minturnae and Pompeii; Massaliot coins made after this date are simply not present at Pompeii; I have suggested that Rome punished the city, by removing its flourishing wine-trade, and probably its vineyards, from it (STANNARD/CHEVILLON in press). A further sign of Pompeii's loss of long-distance contacts after 89 is the fact that while pseudo-mint coins are found at Minturnae, showing earlier traffic between the two ports, coins of the Italo-Baetican series and other non-state coinages in Latium are very uncommon at Pompeii.

Conclusions

Coinage began as means of standardising a weight of precious metal in a countable object of recognised intrinsic value. Token coins soon appeared, which derived their value not from metal, but from exchangeability with intrinsic value money. They often depended on an authority to decree and enforce their value by fiat, but our review of Campanian small change has identified a number of cases where it functioned well without fiat value, relying instead on utility value, because small change was a commodity that users needed. There was a tacit convention among users that extended to exchangeability with precious metal, and so closed the cycle of value. The demand for small change seems almost always to have been larger than any official supply, during economic expansion, increasing monetisation and market growth in central Italy in the late Roman Republic.

The way in which Neapolitan bronze was able to become the common coinage of Campania during the 3rd century is a rare example of a fiat coinage becoming current over a large area, well beyond the rule of the polity that made it, particularly so because it seems most likely that cities' bronze coin

stocks circulated very locally, because they were used for small retail purchases, often of local products, and not for bulk goods from other markets, which required precious metal. The way in which the small change of the largest neighbouring market, Rome – which was also the hegemonic power – does not seem to have reached Minturnae and Pompeii in any quantity supports the picture of essentially immobile local stocks of small change. The ubiquity of Neapolitan bronze in Campania is a special case, the reasons for which are to be found in the particular historical circumstances, where peoples who were not yet coin-users took over cities in a Greek monetary zone, and adapted to it. Did they obtain their stocks of Neapolitan bronze passively, as it filtered in with travellers and soldiers, or did they actively seek it out, and bring it into their markets? A deliberate seeking out and importation of Neapolitan coin seems the more likely. We have other examples of such behaviour, including the block of Ebusan coin brought to Pompeii in the 2nd century, and a large block of coins from the island of Kos brought into Latium at about the same time (FREY-KUPPER/STANNARD 2018, 287-298). This reliance on the money of others extended even to precious metal – with Capua, the second largest and probably the richest city in peninsular Italy not coining until it defected to Hannibal – except when the cities needed to strike silver and bronze to pay their troops during the First Punic War, which meant drawing down on and coining bullion holdings.

We have also learnt something of Rome's monetary relationship with its allies and colonies. Most importantly, the survey has also shown – I hope conclusively – that Rome in the Republican period did not interest itself in or police its colonies' and allies' minor coinages, nor supply and them with small change. There is less archaeological evidence with regard to precious metal, because the other polities of central Italy had stopped coining by 225, but the burgeoning mass of Roman silver coin, of full intrinsic metal value, needed no coercion or policy support to become the common currency of the area. Moreover, we know that Rome was happy to use, even make, foreign silver coin outside Italy, in its expanding empire (DE CALLATAÿ 2011).

The Campanian evidence of complete Roman disinterest in enforcing the use of its money upends much received opinion and explanations of ancient monetary behaviour that anachronistically imported into the ancient world the highly-developed and legalistic monetary concepts of feudal and Renaissance states, such as the 'right to coin', 'legal tender' and 'seigniorage'.

Crawford believed that Rome only struck coin to meet the direct needs of the state, and, as for small change, trenchantly described 'a state that did not give a damn for the provision of small change' (CMRR, 185). The Republican mint in fact severely reined in the value of bronze produced

after 146, precipitating a crisis of small change in Rome itself as well as in Campania (STANNARD 2018a, 100-105), and stopped striking bronze altogether after 82. This is the context in which to understand the bronze coins stocks of Minturnae and Pompeii in the 2nd and 1st centuries; both evolve into a dependence on informal coinages, which in Minturnae include local strikes on a Roman model, but even more the many informal coinages of Latium, some of which are shown in Fig. 12; while in Pompeii imported foreign coin and the prolific coins of its pseudo-mint supplied liquidity during its golden age. All these coinages drew their value from utility alone.

Informal coinage does not mean counterfeit coinage, a concept with implications that cannot apply; they include an attempt to fraudulently pass something off for something that it is not, a legal framework that makes this a crime, and procedures to find and punish fraudsters; there is no sign that any of these apply to informal bronze coinage. Moreover, no Republican legislation forbids or punishes the issue of bronze coin without authority or its imitation; the *lex Cornelia de falsis* of 81 BC applies to silver and does not mention bronze; and under the Principate no law governing the counterfeiting of bronze is known to have existed.

There was indeed much falsification of silver coin, in the form of plated pieces with a base metal core, effectively stealing part of the normal weight of precious metal. Many coins show punch-marks and cuts intended to probe the metal below the surface, and there are many plated pieces discovered in this way among site finds; it seems as if people threw them away.

There are very few recognisably fraudulent bronze coins at this time, though many unofficial issues, some imitating Roman coin, some not. Crawford recognised that the lack of official bronze coin had been remedied by the production of unofficial imitations of bronze fractions (CMRR, 185), and these are only now beginning to be adequately described, here RRC 339M/4, and see SCHAEFER/MCCABE (2011), which shows the systematic imitation of an official issue, in numbers that exceed the model.

The discovery during the research for this paper of an official Roman bronze emission made at Minturnae during the Second Punic War, as well as the diverse coins it sometimes overstruck, is evidence of the military and naval importance of that city. The weights, which do not conform to any of the supposed sequential weight/value retariffings, reinforce the opinion that by the end of the war Roman bronze had become a token coinage. For a similar conclusion, motivated by a review of Roman overstrikes on Roman bronze coins during the Second Punic War, see MCCABE/MONTGOMERY (2020).

It has been argued that, while Greek token bronze was not counterfeited, because it stayed in the cities' local, easily policed circulation areas, the presumed imposition by Rome of its coin on

the much wider area of all Italy meant that Rome had no option but to maintain a bimetallic coinage, with bronze struck at full intrinsic metal value, or risk a flood of lightweight counterfeit bronzes (BRANSBOURG 2011). The Campanian evidence instead suggests that none the steps in this argument are correct: Rome did not impose its coinage; Roman bronze was a token coinage by the end of the Second Punic War; and there is no evidence that counterfeiting of small change was a problem.

Appendix: Key to figures, and source of images

Fig. 2. Coordinated military issues with Neapolitan types, of before and during the First Punic War.

1. Neapolis HNI 582 (Numismatica Ars Classica, Auction 64, 616).
2. Cales HNI 436 (Numismatik Naumann, Auction 53, 43).
3. Teanum Sidicinum HNI 454 (Bertolami Fine Arts, Auction 41, 9).
4. Neapolis HNI 589 (Classical Numismatic Group, Mail Bid Sale 61, 11).
5. Cales (HNI does not list Cales with Nike above) (Kunker, Auction 193, 16).
6. Teanum Sidicinum HNI 455 (Classical Numismatic Group, Auction Triton V, 33).
7. Aesernia HNI 431 (Bertolami Fine Arts, Auction 63, 5).
8. Compulteria HNI 437 (Classical Numismatic Group, Mail Bid Sale 61, 10).
9. Suessa HNI 450 (Classical Numismatic Group, Mail Bid Sale 61, 14).
10. Caiatia, HNI, 58, n. to 433, suggests that coins reported as Caiatia are really misread Compulteria, but the legend on this specimen confirms the attribution (Classical Numismatic Group, Auction 305, 21, as Teanum).
11. Nola HNI 607 (Numismatica Ars Classica, Auction 46, 779).
12. Phistelia HNI – (FIORELLI 1870, 708).
13. Larinum HNI 622 (Classical Numismatic Group, Auction 61, 5).

Fig. 4. 'Chopped' Neapolitan coins (HNI 595) from Minturnae, and Minturnaean *sextantes* struck over this coin.

'Chopped' Neapolis, HNI 595, of ca. 250-225

1. 16 mm 2.54 g Liri 45.475 = STANNARD 2018b, 101, no. 12
2. 15 mm 3.00 g Liri 53.166 = STANNARD 2018b, 101, no. 14
3. 14 mm 2.19 g London Ancient Coins, Auction N, 26 June 2014, lot 5
4. 16 mm 2.78 g Liri 45.477 = STANNARD 2018b, 101, no. 13

Sextantes struck over 'chopped' Neapolis, HNI 595, of *ca.* 250-225

5. 16 mm 2.24 g Liri 100.538 London Ancient Coins, stock, February 2020 = Classical Numismatic Group, eAuction 472, 232
6. 17 mm 2.86 g Liri 100.589 = <http://rrdenarius.blogspot.fr/2016/05/overstrikes-brockages-die-clashes-and.html> (accessed 16.05.2016) = Asta Artemide 33E, no. 99 = STANNARD 2018b, 104, no. 23
7. 15 mm 2.86 g Liri 37.152 = MORELLO 2007 = STANNARD 2018b, 104, no. 24
8. 16 mm 2.44 g ANS 2015.20.2032 (Witschonke)

Fig. 5. Examples of *trientes* of the Second Punic War issue at Minturnae.

1. 19 mm 4.00 g CATALLI 1986, 66, no. 291
2. 22 mm 7.32 g Classical Numismatic Group, Auction 368, 405
3. 22 mm 6.03 g Roberto Russo collection
4. 23 mm 6.80 g CATALLI 1986, 66, no. 280
5. 23 mm 6.79 g Jean Elsen & ses fils, Auction 912, 187
6. 23 mm 8.08 g Classical Numismatic Group, Mail Bid Sale 61, 1128
7. 23 mm 5.34 g Liri 100.678
8. 23 mm 7.48 g Numismatica Ars Classica, Auction 61, 225 = MORELLO 2007, 20, 1a
9. 22 mm 4.43 g Bertolami Fine Arts, eAuction 63, 322
10. 20 mm 4.83 g Numismatik Naumann, Auction 42, 613
11. 21 mm 4.64 g Heritage Auctions, 3020, 255374
12. 21 mm 5.26 g London Ancient Coins, Auction N, 105
13. 23 mm 7.47 g Roberto Russo collection
14. 21 mm 6.08 g Roberto Russo collection = MORELLO 2007, 20, 1c
15. 22 mm 5.50 g Roberto Russo collection
16. 21 mm 3.56 g Numismatica Ars Classica, Auction 61, 226
17. 20 mm 4.94 g Classical Numismatic Group, eAuction 364, 66
18. 21 mm 6.81 g Roberto Russo collection
19. 22 mm 7.27 g Roma eSale 11, 106
20. 19 mm 5.05 g London Ancient Coins, Auction E, 117
21. 18 mm 4.05 g London Ancient Coins, Auction L, 125
22. 20 mm 5.96 g Roberto Russo collection
23. 19 mm 4.60 g Liri 100.679 = Roma Numismatics, eSale 33, 335
24. 21 mm 5.15 g London Ancient Coins, Auction 30, 124

Fig. 6. Examples of *quadrantes* of the Second Punic War issue at Minturnae.

1. 18 mm 5.96 g Liri 100.680 = Numismatica Ars Classica, Auction 92, 1542

2. 20 mm 5.23 g Classical Numismatic Group, eAuction 2 January 2019
3. 18 mm 3.08 g Liri 100.681
4. 19 mm 3.88 g Bertolami Fine Arts, eAuction 23, 370
5. 18 mm 3.36 g Triskeles, Auction 17, 249
6. 17 mm 4.47 g London Ancient Coins, Auction I, 139
7. 20 mm 3.09 g Agora, Auction 20.4
8. 19 mm 4.45 g Numismatica Ars Classica, Auction 92, 1561
9. 20 mm 4.93 g Roberto Russo collection
10. 21 mm 6.34 g Roma eSale 63, 594
11. 19 mm 3.63 g Elsen, Auction 91, 188
12. 17 mm 2.71 g Classical Numismatic Group, eAuction 147
13. 20 mm 4.03 g Roberto Russo collection
14. 18 mm 3.03 g Roberto Russo collection
15. 20 mm 2.81 g Roberto Russo collection
16. 17 mm 1.71 g Liri 100.696

Fig. 7. Examples of *sextantes* of the Second Punic War issue at Minturnae.

1. 16 mm 2.36 g Aureo & Calicó, Auction 293, 3006
2. 17 mm 2.17 g Liri 100.682
3. 17 mm 2.40 g Numismatica Ars Classica, Auction 61, 230
4. 15 mm 2.16 g Bertolami Fine Arts, Auction 44, 386
5. 16 mm 2.36 g Liri 100.689 = Roma eSale 37, 706 (part) = MCCABE/MONTGOMERY 2020, 268, no. 1d
6. 16 mm 2.24 g Liri 100.538 = London Ancient Coins, stock, February 2020
7. 17 mm 2.56 g Liri 100.690 = ANS 2015.20.3392 (Witschonke)
8. 15 mm 3.31 g Classical Numismatic Group, eAuction 337, 324
9. 17 mm 2.78 g Liri 100.683
10. 17 mm 2.78 g Liri 100.684
11. 16 mm 2.16 g Numismatica Ars Classica, Auction 72, 417
12. 17 mm 3.93 g Classical Numismatic Group, eAuction 385, 406
13. 18 mm 3.50 g Liri 100.691
14. 17 mm 2.68 g Numismatica Ars Classica, Auction 78, 373 = MORELLO 2007, 21, 3b
15. 17 mm 2.21 g Auctiones GmbH, eAuction 66, 131
16. 17 mm 1.80 g Roberto Russo collection
17. 17 mm 3.34 g Numismatik Naumann, Auction 31, 428
18. 17 mm 2.77 g Agora Auctions, Sale 59, 141
19. 16 mm 1.40 g Numismatica Ars Classica, Auction 83, 244
20. 16 mm 1.56 g Pegasi Numismatics, Auction 38, 377
21. 17 mm 3.92 g Roberto Russo collection = MORELLO 2007, 21, 3c

22. 15 mm 1.72 g CNG, eAuction 279, 222
23. 15 mm 2.52 g Roberto Russo collection
24. 15 mm 2.06 g Roberto Russo collection
25. 15 mm 2.16 g Bertolami Fine Arts, Auction 44, 386
26. 15 mm 2.35 g Bertolami Fine Arts, eAuction 6, 128
27. 14 mm 1.45 g London Ancient Coins, Auction 37, 280
28. 14 mm 2.16 g Bertolami Fine Arts, eAuction 63, 325
29. 15 mm 1.47 g Roma Numismatics, May 2013 Auction, 1089
30. 14 mm 1.61 g Liri 100.686
31. 16 mm 1.56 g Pegasi Numismatics, Auction 38, 377
32. 14 mm 2.07 g Liri 100.695 = Roma Numismatics, Auction 32, 682
33. 14 mm 2.05 g Liri 100.685
34. 14 mm 1.08 g Roma Numismatics, eSale 32, 683
35. 13 mm 0.89 g Liri 100.687
36. 13 mm 1.07 g Liri 100.688

Fig. 8. Sardinian anonymous *sextantes*, struck over SNG COP. 42, 387-388, dated by VISONÀ (2013) to 241-238.

1. 16 mm Roberto Russo collection
2. 17 mm Roberto Russo collection = McCABE/MONTGOMERY 2020, fig. 1c
3. 18 mm 3.72 g Private collection

Fig. 9. Overstrikes on Neapolis, Rome, Syracuse, and Carthage.

Triens over Neapolis, HNI 582, of *ca.* 200-275

1. 22 mm 5.38 g Roberto Russo collection = McCABE 2013, H1.Tr.3
- A. 16 mm 3.23 g SNG PARIS 6,1, 896

Sextans over Neapolis, HNI 474, of *ca.* 320-300

2. 16 mm 2.28 g British Museum, 2002,0102.5467 = HERSH 1987, 20 = GHEY *et al.* 2010, 552.1.5
- B. 16 mm 5.01 g SNG PARIS 6,1, 880

Trientes over Rome

3. 22 mm 7.89 g Agora Auctions, Sale 65, 133
4. 23 mm 4.46 g Numismatica Ars Classica, Auction 72, 416 = McCABE 2013, H1.Tr.6

Trientes over Syracuse, Hieron II, SNG ANS 5, 964-1016, of 275-215

5. 21 mm 5.67 g Roberto Russo collection
6. 20 mm 4.94 g Roberto Russo collection = McCABE 2013, 175, H1.Tr.5
- C. Agora, Auction 75, 2 = McCABE 2013, H1.Tr.5

Quadrans over Carthage, Carthage mint, SNG COP. 42, 302-324, of 221-210

7. 21 mm 4.28 g Roberto Russo collection
- D. 23 mm Hirsch, Auction 296, 1984

Sextans over Carthage, mint in western Sicily, *ca.* 320-290/280, SNG COP. 42, 109-119, of *ca.* 320-290/280

8. 17 mm 2.27 g Elsen Auction 136, 79
- E. 16 mm 2.90 g Bertolami Fine Arts, eAuction 67, 473

Sextans over Carthage, uncertain mint, SNG COP. 42, 126-127, of the early 3rd century

9. 17 mm RBW collection, not published
- F. 18 mm 2.46 g Rauch, Auction 86, 114

Sextantes over Carthage, SNG COP. 42, 397-398 and ALEXANDROPOULOS 2007, no. 96 bis, of *ca.* 208-202

10. 17 mm 2.78 g Classical Numismatic Group, Auction 432, 211 (part)
11. 19 mm 2.00 g Liri 100.677 = Roma Numismatics, eSale 36, 311
12. 17 mm RBW collection, not published
- G. 17 mm Noble, Auction 106, 3452

Fig. 10. Roman-style *quadrantes* probably made at Minturnae in the 90s, of which 9-14 are from the Republican Bathhouse at Regio VIII 5.36 in Pompeii.

1. 19 mm 3.53 g Liri 100.697
2. 19 mm 3.72 g Liri 100.698
3. 16 mm 1.95 g Liri 100.712
4. 16 mm 3.89 g Liri 100.700 = Numismatica Ars Classica, Auction 63, 20 = McCABE 2013, 111, M.Qd.1
5. 18 mm 3.12 g Liri 100.701 = Agora, Auction 38, 129
6. 17 mm 3.90 g Liri 100.704
7. 17 mm 2.44 g Liri 100.638
8. 17 mm 2.93 g Liri 100.702
9. 17 mm 3.13 g Numismatica Ars Classica, Spring Sale 2020, 435
10. 15 mm 2.34 g Liri 100.703
11. 17 mm 3.33 g Bertolami Fine Arts, Auction 7, 410
12. 16 mm 2.34 g Liri 63.105
13. 17 mm 2.93 g STANNARD 2019, 85 = Naples P9015
14. 16 mm 2.78 g STANNARD 2019, 86 = Naples P9021
15. 17 mm 3.67 g STANNARD 2019, 87 = Naples P9018
16. 19 mm 3.40 g STANNARD 2019, 88 = Naples P9019
17. 16 mm 2.79 g STANNARD 2019, 89 = Naples P9022

18. 18 mm 2.57 g STANNARD 2019, 90 = Naples P9023

Fig. 12. Non-state small change at Minturnae in the 2nd and 1st centuries.

STANNARD 2007, 38, series 60

Obv. Bearded head of Vulcan right, wearing pileus and with tongs on shoulder; P·CAIO before; border of dots.

Rev. Ring, from which are suspended two strigils and an aryballos; caduceus behind the left strigil; F to right; border of dots.

1. 17 mm 3.55 g Liri 63.014

Rev. Cornucopia; border of dots.

2. 19 mm Liri 32.005 = Gorny & Mosch, Auction 237, 1024

STANNARD 2007, –, *quadrans*

Obv. Head of Vulcan right, wearing pileus and with tongs on shoulder; ⚡ behind; border of dots.

Rev. Man standing facing, holding the strigils and aryballos in his left hand; torch (?) and PANSA down to left; plough (?) to right; border of dots.

3. Roberto Russo collection = Liri 51.011
4. 17 mm 4.09 g Liri 60.007

STANNARD 2007, 21, series 17a, *quadrans*

Obv. Female head right; ⚡ behind; border of dots.

Rev. Naked cupid running right, carrying two torches; border of dots.

5. 16 mm 3.04 g Liri 56.007
6. 15 mm 2.51 g Liri 63.013
7. 17 mm Roberto Russo collection = Liri 51.013

STANNARD 2007, 27, series 39

Obv. Helmeted head right; SC·ÆVA around before; border of dots.

Rev. Centaur right with crossed palm-fronds in his raised hands; MF or M² below; border of dots.

8. 17 mm Roberto Russo collection = Liri 51.017 = BABELON 1885-1886, Aufidia 4: 'La pièce est d'attribution incertaine'

STANNARD 2007, 58, series 95a

Obv. Laureate, bearded male head right; border of dots.

Rev. Filleted cornucopia, bunches of grapes suspended from it; border of dots.

9. 16 mm 3.38 g Liri 100.542 = Gorny & Mosch, Auction 237, 1023

STANNARD 2007, 58, series 95

Obv. Same, but bald and beardless.

10. 15 mm 3.94 g Liri 63.025

STANNARD 2013, 374, 36-37. *Quadrantes* on triangular flans

Obv. Head of Mercury wearing petasus right; border of dots.

Rev. Prow right; ⚡ before, ROMA above.

11. 21 mm 6.46 g Roberto Russo collection = Liri 51.014
12. 22 mm 4.89 g Liri 100.367

STANNARD/SINNER 2014, 171-174; ARÉVALO/DELGADO 2016, 127, 9. Lead *quadrans* from the Isla Pedrosa wreck off Estartit in Catalonia, ca. 140/130

Obv. Head of Vulcan right, wearing pileus.

Rev. Boy kneeling left, tying the shoe, or washing the foot, of a stooping man, facing right; ⚡ to right; ring, from which are suspended two strigils and an aryballos in field above value-mark; ...VR (?) behind.

13. 20 mm 4.80 g RICHARD/VILLARONGA 1975, 12; ARÉVALO/DELGADO 2016, 127, 9

STANNARD 2007, 68, series 161a; STANNARD *et al.* 2019, 133, M11.

Lead *quadrans*

Obv. Oil-lamp right; *** above; CN·CORNILI·P·S below.

Rev. Amphora, with a rope (?) draped over the top; CN·CORNILI·P·S around; border of dots.

14. 17 mm 3.23 g Liri 27.070

STANNARD 2007, 25, series 37d

Obv. Laureate head of Janus; OPTI around; all in laurel-wreath.

Rev. Laureate head of Jupiter right; border of dots.

15. 17 mm 5.12 g Liri 100.637

STANNARD 2007, 31, series 47b

Obv. Man wearing tunic walking right, carrying askos in right hand; shovel, or standard, on his shoulder; border of dots.

Rev. Man walking left, a sack over his shoulder, and his right hand raised; D·P·OR to left; border of dots.

16. 23 mm 3.58 g Liri 42.036

STANNARD 2007, 29, series 45

Obv. Bacchus riding a pig left, a cantharus in his extended right hand, and a thyrsus in his left; NN to right; all in laurel-wreath.

Rev. Mercury standing facing, a caduceus in his left hand, and a purse in his right; SEX around; all in laurel-wreath.

17. 20 mm Liri 100.514

STANNARD 2007, 4, series 15

Obv. Head of Dionysus, crowned with ivy, right; border of dots.

Rev. Panther standing right, its left fore-paw raised to hold a thyrsus over its shoulder; border of dots.

18. 18 mm 7.39 g Liri 100.562 = Bertolami Fine Arts, E-live Auction 41, 116

- Rev. Panther standing right, its left fore-paw raised to hold a thyrus over its shoulder; border of dots; star above.
19. 17 mm 2.80 g Liri 100.666 = Numismatica Tintinna, Asta Elettronica 85, 45
20. 15 mm 2.56 g Liri 100.449 = Ancient Imports website 25 February 2013 = Classical Numismatic Group, eAuction 364, 2 December 2015

- STANNARD/CARBONE 2013, 379, O4/R9. Latin Pseudo-mint, imitating Panormus
- Obv. Bearded male head left; border of dots.
- Rev. Helmeted warrior standing left, leaning on a staff, and holding out his right arm; border of dots; garbled representation of the prototype legend = SONAL TA.
21. 17 mm Liri 100.624

- STANNARD/CARBONE 2013, 281, O14/R20. Latin Pseudo-mint, imitating Paestum
- Obv. Helmeted right hand right; S behind, PAE before; border of dots.
- Rev. Clasped hands; garbled representation of the prototype legend: L.F / L.SA; border of dots.
22. 16 mm 4.34 g Liri 100.437 = VAuctions 290, no. 66 = Ancient Coin Imports, 19 November 2012

- STANNARD/CARBONE 2013, 284, O24a/R34. Latin Pseudo-mint, imitating Menaion in Sicily
- Obv. Head of Hercules, wearing the lion's skin, right.
- Rev. Cornucopia; a pileus crowned by stars on either side; N to left, trace of legend to right.
23. 21 mm 2.51 g Liri 46.038

- STANNARD/CARBONE 2013, 285, O28/R41. Latin Pseudo-mint, imitating Termessus in Pisidia
- Obv. Laureate head of Mercury right.
- Rev. Free horse galloping left; three dots instead of TER below; border of dots.
24. 16 mm 1.84 g Liri 100.521 = Ancient Coin Imports stock, April 2014

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Abbreviations

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Metal-object currency before coinage: China and the West

by ALAIN BRESSON

Metal-object currency, fiat money, fiduciary money, commodity money, China, Western Eurasia

This paper draws a comparison between the pre-coinage monetary developments in China and in societies of Western Eurasia. Before they introduced genuine coinage, both worlds experienced not only a monetary use of metals such as bronze and iron, but also the development of metal-object currencies, which locally could take the form of spades, knives, axes or spits. These objects were often of smaller size and unserviceable for ordinary use. They are found in hoards whose size ranges from a few up to several hundreds of items, even several thousands in some cases. Even if they may sometimes have been weighed, they were meant to be used by number rather than by weight. Metal analysis reveals that their composition could also differ from that of the metal of ordinary tools or weapons. Thus, both in China and Western Eurasia, the ratio of lead to copper and tin could exceed 50 % in some series of bronze metal-object currencies. This was certainly a way to maintain the circulation of these currencies by preventing them from being melted down. The use of metal money seems to embody the notion of commodity money. But the fiduciary aspect of these metal-object currencies invites us to revisit this common view. It is remarkable that China and societies of Western Eurasia experienced similar developments, although these two worlds were not connected to one another. Their monetary practices diverged only with the increasingly massive use of gold and silver in Western Eurasia, a similar development being impossible in China due to the limited availability of these metals. But several of the constraints that framed the development of coinage already played the same role for that of the metal-object currencies before the introduction of coinage.

Metallobjektwährungen vor dem Münzgeld: China und der Westen

Metallobjektwährung, Fiatgeld, Treuhandgeld, Warengeld, China, Westurasien

In diesem Beitrag werden die monetären Entwicklungen in China und in einigen Gesellschaften Westeurasiens vor dem Auftreten von Münzgeld miteinander verglichen. Vor der Einführung des echten Münzwesens erlebten beide Welten nicht nur eine monetäre Verwendung von Metallen wie Bronze und Eisen, sondern auch die Entstehung von Währungen aus Metallgegenständen, die – regional unterschiedlich – etwa die Form von Spaten, Messern, Äxten oder Spießen annehmen konnten. Diese Gegenstände waren oft von bescheidener Größe und für den normalen Gebrauch nicht zu verwenden. Man findet sie in Horten, deren Größe von einigen wenigen bis zu mehreren hundert, in manchen Fällen sogar mehreren tausend Gegenständen reicht. Auch wenn sie manchmal gewogen wurden, sollten sie nicht nach Gewicht, sondern nach Anzahl verwendet werden. Metallanalysen zeigen, dass sich die Zusammensetzung des Metalls dieser Objekte von gewöhnlichen Werkzeugen oder Waffen unterscheiden konnte. So konnte sowohl in China als auch in Westurasien das Verhältnis von Blei zu Kupfer und zu Zinn in einigen Serien von Währungen aus Bronzeobjekten bei über 50 % liegen. Diese Materialzusammensetzung war sicherlich gewählt worden, um den Umlauf dieser Währungen aufrechtzuerhalten, da es verhinderte, dass die Objekte eingeschmolzen wurden. Die Verwendung von Metallgeld scheint den Begriff des Warengeldes zu verkörpern. Aber der treuhänderische Aspekt dieser Metallobjektwährungen führt uns dazu, dieses allgemeine Verständnis zu überdenken. Es ist bemerkenswert, dass China und Gesellschaften des westlichen Eurasiens ähnliche Entwicklungen erlebt haben, obwohl diese Welten nicht miteinander verbunden waren. Ihre monetären Praktiken unterschieden sich nur durch den zunehmend massiven Einsatz von Gold und Silber in Westurasien, wobei eine ähnliche Entwicklung in China aufgrund der begrenzten Verfügbarkeit dieser Metalle unmöglich war. Aber einige der Zwänge, die die Entwicklung des Münzwesens umrahmten, spielten bereits vor der Einführung des Münzwesens die gleiche Rolle bei den Währungen mit Metallobjekten.

It is fascinating to observe both in the Chinese and the Western Eurasian intellectual traditions the existence of a similar debate on the nature of money, which in both cases started in Antiquity (China and the West: VON GLAHN 1996, 23-47; Western tradition: SCHUMPETER 1954, 50-65, 274-276; BRESSON 2012 for Plato and Aristotle; CESARANO 2014). This debate opposed those for whom money is (or should be) a commodity, and those for whom it should be envisaged as a pure convention, being fiat money or fiduciary money. In a commodity money system, the value-per-weight of the currency is acknowledged as being always the same, regardless of whether it is exchanged as money or as a commodity. In a fiat money system, the value of the currency is determined by a political authority. The closely linked, but not identical, concept of fiduciary money applies to a situation where the value of the currency is disconnected from its value as a commodity (the trust in this currency can be established by agreement between partners or imposed by a state).

Actually, the parallel between China and Western Eurasia goes beyond the existence of this intellectual debate. Indeed, even before coinage was introduced – in the West in western Asia Minor in the mid-7th century BC, and in China in the 5th or 4th century BC – a transition to metal money can also be observed. The metals used as money were those commonly in use for other purposes, first of all bronze, but also iron. In fact, these developments are not specific to China and Western Eurasia. Metal money was adopted in other continents, such as Africa (BOHANNAN 1955; GUYER 1995). The reasons behind the adoption of metal as money were made clear by Stanley JEVONS (1919, 29-51): 1) utility and value; 2) portability; 3) indestructibility; 4) homogeneity; 5) divisibility; 6) stability of value; 7) cognizability.

The parallel between China and in Western Eurasia is even more striking if one observes that we find in both worlds (and again not only there) not only the use of metal money, but the existence of currencies first taking the shape of metal objects commonly in use in these societies, then soon transformed into items which by their sizes and other characteristics sharply differ from their models (DAVIES 2012, 45-48). The fact is perfectly acknowledged by specialists of Chinese money. For Western Eurasia the monetary role of these objects is still debated among western scholars, but his paper shows that the parallel with China invites to overcome these reservations.

However, as this paper also shows, one must go one step further. The grand narrative in the history of money is that in antiquity money began as a commodity money, especially metal money, before moving in the more recent period to fiat-fiduciary money, which is the basis of contemporary money. This is the standard narrative of economics handbooks (SAMUELSON/NORDHAUS 2010, 459).

However, despite its merits in a *longue durée* perspective, this evolutionist schema does not render the complexity of the relationship between commodity and fiat or fiduciary money before coinage. Metal analyses of metal-object currencies (and occasionally also other sources) from both China and a selection of examples from Western Eurasia reveal that the metal of these metal-object currencies was very significantly debased as compared to that of the ordinary objects which originally were their models. This invites to admit in both worlds the existence of a period of significant fiduciary component for these metal-object currencies. Although being indubitably metal money, these objects were also truly fiat money. The paradox is that over time, in a development which is very clear for China, but which can be hinted at also in Western Eurasia, the fiduciary component of currencies decreased, and in that matter it seems possible to establish a clear parallel between bronze Chinese money of the 3rd century BC and Roman bronze money of the same period. In that sense, at least for metal-object currency, commodity metal money, or a form of commodity metal money, is more a point of arrival than a starting point.

Thus, for a very long period, China and the societies of Western Eurasia shared a common pattern of monetary development. A fundamental divergence appeared only with the increasingly massive use in Western Eurasia (first in the societies of the Eastern Mediterranean, the Levant, Mesopotamia and Iran) of weighed precious metal money, gold and silver, then of precious metal coins. Yet, even despite these now diverging patterns of monetary developments, the history of the metal-object currencies on the *longue durée* invites to revisit the conditions of the development of coinage.

The Chinese benchmark

In China, money began with cowrie shells and similar types of precious goods. Starting in the 2nd millennium BC, cowries began to circulate in increasingly large numbers. They are also mentioned in the literary tradition (THIERRY 1993, 39-44; PENG 1994, 8-12; SCHEIDEL 2009, 139). They were initially perhaps used only as a measure of value rather than as a medium of exchange and the date at which they became a real form of currency is disputed (SCHEIDEL 2009, 139). They were used in certain regions well into the Qin and Han periods, at the end of the 1st millennium or even later. One should refrain from asserting that cowries had no value by themselves. Their decorative role conferred them a market value. Cowries could only be obtained through exchange and this fitted well with their role as currency. But this was also a factor negatively impacting their role as currency, as the demand for money could not be easily met by their limited supply. The discovery of substitutive

bone or bronze cowries is proof of this difficulty (THIERRY 1993, 44-48).

As early as the 2nd millennium BC however, bronze also began to be used as money in China, a situation which lasted well into the modern era (CRIBB 2005 for an overview). Since the end of 1970s, a new attention has been devoted to hoards formed of bronze chunks of various size, from 10 g to 1 kg, for total weights of the hoards from a few kilos up to 150 kg (DAI/ZHOU 1998). In 1998, 13 of these hoards had been properly recorded. But it is clear that there were many others. The hoards were often (but not always) found in funerary contexts. They consist of pieces of large broken cakes, but which never fit together. This proves that these objects circulated significantly before being buried, which in turn points clearly towards a usage as currency. The hoards come from various regions of China, like the Huang He (Yellow River) region, but especially from the regions of the lower Yangtze (Blue River) valley, that is from territories corresponding to the former kingdom of Wu, in the Western Zhou (*ca.* 1100-771 BC) and Spring and Autumn (770-476 BC) periods, that is comparatively early in the history of bronze currency. Most interestingly, their alloy is relatively poor in copper and rich in lead, as proved by the analysis of the pieces of two of the hoards (Tab. 1).¹

Alloys with very high lead content and no tin should not be explained by a local lack of tin. They correspond to a deliberate desire to create a specific alloy (DAI/ZHOU 1998). Chinese bronzesmiths were masters in creating alloys with different contents of copper, tin and lead, for instance for the various parts of a sword, which each required specific metallic qualities (LIAN/TAN 2002; LI *et al.* 2020). In the Western Zhou period, the high quality of the bronzes manufactured in the royal court contrasted with that of the bronzes manufactured in regional contexts (LI *et al.* 2020). The choice of a very high lead content (the ratio of which is even superior to that of copper) proves a deliberate desire to create an alloy specific for a certain usage: that of currency.

In China, starting perhaps at the end of the 2nd and beginning of the 1st millennium BC, but certainly developing during the periods of the Spring and Autumn and Warring States (475-221 BC), currency also took the form of cast bronze spades, hoes or knives. China was not a unified country and there exists a significant diversity in shapes (THIERRY 1997, 49-83). These objects were not functional ones. Originally from the size of the actual objects that they imitated, they became increasingly smaller and lighter. The length of the spades and of the knives was reduced to a few centimetres, and their

Kingdom	Region	Item	Cu (%)	Pb (%)	Sn (%)
Wu	Jiangsu pr.	chunks	46.61	52.07	? < 2
Wu	Zhejiang pr.	chunks	49.33	50.10	? < 1

▲ Tab. 1. Average composition of the alloy of bronze chunks from two hoards of the Western Zhou and Spring and Autumn periods from the kingdom of Wu (DAI/ZHOU 1998).

Kingdom	Region	Item	Number of items	Cu (%)	Cu (σ)	Pb (%)	Pb (σ)	Sn (%)	Sn (σ)
Zhou	Central plain	spades	5	60.7	2.0	26.5	5.2	9.5	3.4
Zhao	Central plain	spades/ knives	12	54.5	10.3	36.2	11.4	5.1	2.0
Wei	Central plain	spades	16	76.7	4.8	14.8	5.3	3.0	1.8
Qi	Eastern area	knives	12	58.3	10.3	30.0	11.8	6.9	4.0
Yan	Northern area	knives	20	42.8	6.5	50.0	7.8	2.6	2.1
Chu	Eastern area	yibis	5	68.7	5.2	8.9	5.3	17.1	2.0

▲ Tab. 2. Average composition and standard deviation of the alloy of spades, knives and yibis of the period of the Warring States (for Zhou, including some spades of the Spring and Autumn periods) (raw data from DAI/ZHOU 1993).

weight to a few grams. Many spade and knife series have a hole, which allowed them to be tied in bundles. They are commonly found in hoards of up to several hundred items. Sometimes, they could form the embryo of a system, with a heavier denomination and a lighter one, the ratio of their values corresponding to that of their weights. From around 700 BC onwards inscriptions on these objects – although rarely occurring – may provide this type of information. Thus, during the Warring States periods, the alloy of the bronze spades or knives of various Chinese kingdoms had the following composition (DAI/ZHOU 1993; 1998) (Tab. 2).

It can be observed that the composition of the alloy varied significantly from one kingdom to the other and that within the same kingdom it could also vary significantly, although far more in some kingdoms than in others. The spades or knives have high ratios of lead, although in general lower than those of the hackbronze. The percentage of tin remains low, with the exceptions of the kingdoms of Zhou and above all of Chu for the small yibi (“ant nose”) coins, where it is comparatively very high.

From at least the 4th-3rd century BC, a new form of bronze currency was introduced in various kingdoms of central and northern China (THIERRY 1997, Three Jin: 83-88, Yan: 118-119, Qi: 29-131, Qin: 165-183; 5th-4th century for VILÉN 2018, 48-55). These were circular coins, with a characteristic hole at the centre (sometimes a circular hole, but most often a square one), so that they could be conveniently threaded on square rods and strings, given the large numbers that had to be manipulated. This shape derived from that of the ceremonial jade discs used under the Zhou dynasty. The general design remained substantially unchanged for

¹ The Jiangsu and Zhejiang provinces are located respectively north and south of modern Shanghai. With due caution, one assumes here that hoard “no. 8” (h) in DAI/ZHOU 1998, 302, is in fact hoard no. 9 (i), where the details of the hoard have been duly recorded.

Kingdom	Region	Item	Number of items	Cu (%)	Cu (σ)	Pb (%)	Pb (σ)	Sn (%)	Sn (σ)
Qin	kingdom	banliang	7	74	9.7	15.1	9.5	8.7	4.5
Western Han	Empire	banliang	14	78	12.1	12.9	11.5	5.7	4.7
Wu Di	Empire	wuzhu	10	80	4.7	14.6	4.1	2.7	0.5

▲ Tab. 3. Average composition and standard deviation of the alloy of the banliang of the Qin kingdom in the period of the Warring States, of the Western Han between 206 and 118, and of the wuzhu coins of Wu Di (raw data from DAI/ZHOU 1993).

more than two millennia. It was the state of Qin that played the major role in the definition of these coins. Coins were minted along the standard of the liang (the Chinese ounce). The name of banliang (half liang), of 8 g, which was that of the standard denomination, was inscribed on the coin.

Under Emperor Qin Shi Huang (who was supposed to have introduced the banliangs, although we know that this was not the case), the banliangs became the official currency of the whole Empire, in principle replacing the other forms of money (SCHEIDEL 2009, 140). The system of the banliang was first kept by the succeeding Han emperors (who seized power in 202 BC). In 118 BC, a monetary reform was implemented by emperor Wu Di, who introduced the new system of the wuzhu coins. Remarkably, the alloy of the banliang and that of the wuzhu coins (“five zhu”, a zhu being a weight unit of ca. 0.66 g), differed significantly from that of the previous forms of currency (DAI/ZHOU 1993) (Tab. 3).

With the banliang and wuzhu coins, the percentage of copper increased significantly, that of lead decreased accordingly, and that of tin varied significantly just like in the previous period. The mentioning of its weight on the coin as an indication of value shows a deliberate intent to link the metallic content of the coin to its value.

Whether this made these coins true commodity money is a matter of debate. Remarkably, under Emperor Qin Shi Huang gold then officially became part of the monetary system (SCHEIDEL 2009, 155-169, 184-185 for precious metals in China). But admittedly, for lack of adequate quantities, precious metals were never circulated in the form of coins, the way they were in Western Eurasia. As for the banliang and wuzhu coins, their actual variations in both their weights, thus not conforming with their ideal standard, as well as alloy, which despite the sharp increase in the ratio of copper, was never perfectly stable, shows that things were not that simple. There was a debate in China between the Confucian scholars, for whom money was to be purely fiduciary, and the legist scholars, who advocated for commodity money (VON GLAHN 1996, 35-42). The same question is still a point of contention between contemporary specialists. François THIERRY (1993; 1997, 34-39; 2001) defends the view of a mainly fiduciary nature of ancient Chinese money. Walter SCHEIDEL

(2009, 142, 195-196) finds this approach “naive” and insists on the lack of a real difference between the money of the Roman Empire, supposed to be a commodity money system, and that of ancient China, supposed to be a fiduciary one.

It suffices here to note that the increase in the ratio of copper following the introduction of the banliang and the decrease in the ratio of lead created a tension that so far did not exist, and which in turn helps us make sense of the high ratios of lead in earlier currencies. On the basis of data from the Tang period (618-907 AD), but with coins with ratios of copper, lead and tin similar to those of the earlier banliang or wuzhu coins, SCHEIDEL (2009, 193) calculates that the average cost of producing a coin (including the loss during the process of fabrication, the cost of the fuel and of labor) was 75 % the face value of the coin. As for the intrinsic metal value, the ratio with the face value could have been around 41 %. If its official value did not correspond to the actual value of the metal, the difference was not gigantic and was sufficient for ordinary people to accept the coins that they come to have in their hands. Their metal content procured a form of guarantee of the value of the coin.

But if some reasons the trust in the currency was undermined the incentive for counterfeiting could become massive (SCHEIDEL 2009, 148). The attempt of Emperor Wang Mang, in the early 1st century CE, to introduce a purely fiduciary system in the Confucian tradition with “bronze notes” disconnected from their metal value proved to be a disastrous failure (THIERRY 1993, 6). Thus, among others, the reform established an equivalence between 25 huoquan (a huoquan being a “money coin” of actually variable weight, with perhaps an average weight of 3.5 g), for a total of 80 g, and a huobu (“money spade”) of 15 g. The public reacted by melting down five huoquan to fabricate illegally a huobu, the profit being 20 huoquan. Here the margin of profit was so high that it seemed worth profiting from the opportunities unwittingly offered by the official monetary system. This experience illustrates the difficulty to maintain an officially defined metal commodity currency. The public is never passive. It reacts directly to the opportunities offered by the monetary system. This also helps explain the specifics of Chinese currency in the longue durée.

Indeed, several conclusions can be drawn from this longue durée approach towards Chinese money. Chinese metal currency started with chunks of bronze, which could be defined as hackbronze, in reference to the hacksilver of the 1st millennium Eastern Mediterranean money. These chunks of bronze were made from broken objects circulating independently from the other pieces of the same object. Above all, they had a lead content over 50 %, which separated them from ordinary bronze objects. The metal content of this hackbronze was specifically defined for the role of currency. As for

the bronze spades, hoes and knives used as currency, they were quickly turned into miniature objects, the role of which was purely monetary. Their copper content was higher, frequently over 60 %, but the (admittedly variable) lead ratio remained on the order of 30 %. It is only with the banliang and wuzhu coins that the copper content frequently reached *ca.* 75 % or more and that the lead ratio typically remained under 20 %.

The initial logic behind the choice of heavily leaded currency was that it prevented their owners from treating them as commodities and to melt them down to reuse them with profit for ordinary usage. It was perhaps only when more stable and powerful states, especially the kingdom, then Empire, of Qin, followed by that of the Han, were established, that it was possible to reduce the lead content and to move towards a form of almost full commodity currency, according to the model presented above. It is also possible that a fall in the price of copper made it less attractive than before to melt down the currency, while originally only a very high lead ratio prevented the melting of the currency.

If we now turn to Western Eurasia, can we observe situations similar to those of China? The answer is positive. Four cases will illustrate situations where metals found a form of monetary usage that was deliberately conceived as separated from their ordinary value as a commodity. Indeed, the first three predate the introduction of coinage. They are those of 1) Brittany and its neighbouring regions in the Late Bronze Age and Early Iron Age; 2) Scandinavia and northern Central Europe in the 1st millennium AD (an excursus that is justified below); 3) Archaic and Early Classical Greece; 4) Late Iron Age Italy and Early Republican Rome.

1. Armorican-type socketed axes from Brittany

From *ca.* 2500 to *ca.* 800 BC, western Europe experienced a dramatic transformation, in which bronze played a fundamental role as a raw material for weapons and tools. For this reason, bronze became a high value good.

Starting in the mid-2nd millennium BC, an increasingly larger number of hoards containing bronze objects is recorded. The meaning of these accumulations is debated. However, there are reasons to think that some categories of exchange could be operated on the basis of weighed metal. The presence of weights, and in the most favourable circumstance, of balance beams, is the clear testimony of the practice of weighing goods in the exchange process (see RAHMSTORF 2019 for Britain; and more broadly for western Europe IALONGO 2019 and IALONGO/RAHMSTORF 2019). The same observations can be made for the Eastern Mediterranean and Mesopotamia (RAHMSTORF 2006; 2010; 2014). Interestingly, a contrast can be observed between two largely mutually exclusive types of hoards. Some consist

in bronze ingots, others of broken bronze objects. This contrast seems to also suggest two types of exchange, the first one based on units of fixed denominations and the second one based on a “freely scalable” principle according to the local weight-system standards (RADIVOJEVIĆ *et al.* 2019, 162), although admittedly the two systems may not have been mutually exclusive. In both cases, however, we seem to remain in a classic situation where a metal is used as commodity money (whatever this actually means for the societies of the Bronze Age and the nature of the goods that were traded).

But the situation of the 1st millennium BC, at the end of the Bronze Age and Early Iron Age, reveals unexpected developments. In what is today north-western France (Brittany and neighbouring regions), a large number of hoards of bronze objects has been found, corresponding to two distinct phases: 346 are from the 9th century BC (the end of the Late Bronze Age in this region) and 350 are from the 6th century BC (the Early Iron Age in this region) (MILCENT 2017). A detailed study shows that in the first phase, the hoards are composed of objects of diverse nature, intact or broken, but over time increasingly broken and dispersed far from their places of origin. Fragments of the same object are then no longer found together. This inevitably suggests that these chunks of metal were now separated from their original functionality and circulated independently. The presence of beams and weights in Late Bronze Age settlements suggests that it was possible to weigh these chunks of metal and confirms that they could be used as payments in transactions.

In the second phase (6th century BC), the hoards are composed of the so-called Armorican-type socketed axes. These axes are smaller than normal axes, sometimes taking on the form of miniatures, and they have no proper edge. Their high lead content, sometimes over 50 % (MILCENT 2017, 729), made them totally improper for any practical use. They are found in large quantities in accumulation hoards, commonly of several dozens of items, and once of up to 4,000. The existence of ties such as metal wires or strings facilitated their transport in the form of bundles. They do not show the traces of heavy wear that true axes normally have, but they are worn in a way that suggests that they circulated significantly before being hoarded. This does not make of these axes a form of all-purpose money but their individual characteristics and their forms of accumulation strongly suggests that these axes were used as some form of currency (BRIARD 2001; MILCENT 2017). That they are sometimes found in likely ritual contexts (some hoards have been found in marshes) does not contradict this view, for objects of high value could be legitimately dedicated to the gods.

In the same period but in other regions, accumulations of bronze under various shapes and of iron ingots can also be observed (GOMEZ DE SOTO

2015). This suggests that in the Early Iron Age also there may have existed two systems in parallel, the first one based on metals used as commodity money, where the weight and the value of the metal was the basis for the use as money, and a second one where monetary objects were accounted for by tale, not by weight, although once again the two systems may not have been fully exclusive from one another. The choice of axes for this role of fiat currency in this period was anchored in the symbolic value of the axe in bronze age societies, itself rooted in its symbolic value in previous Neolithic Age societies (PÉTREQUIN *et al.* 2012).

2. Excursus: Metal-object currencies from northern and central Europe from the 1st millennium AD

Before coming to Archaic Greek iron money, it is necessary to make a detour through late antique and early medieval northern and central Europe. At these times, these regions had not transitioned to deep coinage-type monetization and they used commonly metal-object currencies, which justifies this excursus.

The first case is provided by Central Norrland (corresponding to the regions of today's central Sweden), which has provided a total of 119 hoards (118 in the catalogue) of iron objects having mainly the shape of spades (LINDBERG 2009). The hoards contain from a few items to over one hundred. The size of the spades varies according to the region, from 20-28 cm up for the smallest to 55-61 cm for the largest. Their estimate date is the period 300-600 AD, but some of them are earlier (60 BC-150 AD) and other later (774-941 AD, these being C-datings). The monetary function of these iron spades is not clearly established and, on the basis of anthropological parallels, specialists envisage rather a system of gift exchange, for instance for matrimonial transactions rather than properly a commercial usage.

The second case is provided by early medieval central Europe. In the 9th century AD, east-central Europe seems to have not yet transitioned to a deep coinage-type of monetization. In this, it contrasted with its neighbouring regions. To the west, coinage was commonly in use in the Carolingian Empire. To the north, Viking Scandinavia was irrigated by coinage coming from the Moslem lands, starting in the 9th century, and increasingly in the 10th century (KILGER 2008). To the south, Italy and the Byzantine Empire were also lands where coins commonly circulated. This was obviously not the case in central and eastern Europe, which seems to have been a region not permeated, or not deeply permeated, by precious metal coinage (CURTA 2013).

From this period (9th and, perhaps, early 10th centuries AD), a large number of hoards (over 96) from eastern Europe (from today Bulgaria and Rumania) to central Europe (from today Czechia, Slovakia and southern Poland) contain a large array of iron

tools and weapons (SZMONIEWSKI 2010; CURTA 2011). The function of these accumulations has been much discussed. The question has been raised whether these objects were accumulated for purely utilitarian reasons or for savings. Remarkably, among these hoards some of them, from Moravia (Czechia) and southern Poland, contain axe-shaped ingots, which can be accumulated in large numbers in various hoards, such as 105, 115, 170 and 350, even 4,212 in a hoard from Kraków for a weight of 4 t (ZAITZ 1988, 262-271). In this hoard, all the axe-shaped ingots were arranged in bundles, from a few to more than one dozen specimens. The bundles were of similar, although not of precisely equal weight. This arrangement has suggested that these objects were used for some kinds of payment.

Various other hypotheses have however been proposed to make sense of these iron axes (CURTA 2011; 2013). It has been suggested that these axe-shaped ingots were used to pay tributes, and could then be recirculated (as remuneration for services?) in the framework of hierarchically organized states. It has also been suggested that, in parallel to the system of tribute, the ingots were objects of competition for social prestige, like the famous Kwakiutl coppers. The number of items collected would have been a way to distinguish the rank of a person. But this seems however unlikely. Beyond their sheer number, the axes had no distinctive decoration or specific history attached to them, as this was the case with the Kwakiutl coppers. It is also hardly possible to imagine a competitive complex such as that of the potlatch of the Kwakiutl (see BOAS 1895, 342-358; HAWTHORN 1967, 30-32, fig. 152-158; JOPLING 1989, 15-21).

The exact role in the transactions of the iron spades of the Norrland and that of the iron axe-shaped ingots of northern Central Europe certainly deserves further investigations. But this detour through these two well-documented examples from the 1st millennium AD shows that the existence of metal-object currencies such as the Early Iron Age Armorican-type socketed axes from Brittany was not a unicum. Comparatively, the role of similar iron objects in Archaic Greece is easier to define.

3. Metal-object currency in Early Iron Age and Archaic Greece

The Archaic Greek world provides another case of metal-object currency. The dossier is also based mainly on archaeological sources, but some written sources help provide further information on its development. In the Greek world in the Early Iron Age and Archaic period, big bronze tripods and cauldrons were frequently dedicated in sanctuaries, as known from Olympia and Delphi.² Being basic

2 For Olympia, see MAASS 1978; MORGAN 1990, 23-47, esp. 30-39, and PAPA-KONSTANTINO 2002, with chronological table p. 65: The dedications seem to cover the period from the end of the 9th century to the 7th century (but do not disappear afterwards).

cooking implements, tripods and cauldrons were also essential utensils to offer a sacrifice, which consisted in killing an animal and banqueting with its meat (EKROTH 2014, 326). Sacrifices to the gods had been a central aspect of Greek religious practice since the Early Iron Age. The tripod was used as support for the cauldron, which itself was used to boil the meat that would be consumed by the participants. In specific rituals, the axe could also be employed to kill the animal.³ Being massive bronze objects, a commodity of high price acquired only through long distance trade, both tripods and cauldrons were highly valued items beyond their use-value. They ranked among prestige goods, as we see from the *Iliad*. Tripods ranked also among the most valuable prizes awarded to the victors in athletic competitions, as we know from the *Iliad* and from other later testimonies (PAPAKONSTANTINOY 2002). This obviously explains a large number of the dedications in the sanctuaries, for it was customary for the victors to dedicate the prizes they had received.

Besides, because of their high economic and symbolic value in Greek society, both tripods and cauldrons could be used as units of account of bronze. In Archaic Crete, laws of several cities provided for penalties payable in tripods or cauldrons (VON REDEN 1997, 157-158, with references; SCHAPS 2004, 80-92). In the *Iliad*, oxen are mentioned as units of account in contexts that show clearly that they are not envisaged as mediums of payments (SCHAPS 2004, 63-79; SEAFORD 2004, 102-115). Of course, an ox is not a good that can be adjusted to a standard. It is intrinsically non-fungible. This was not the case for bronze tripods or cauldrons, which could be fabricated so as to correspond to fixed weights of metal and whose names in turn could accordingly become standards of value. It can be envisaged that the penalties provided in the laws were effectively paid in tripods and cauldrons, although admittedly we lack formal proof of it. In any case, one should observe the possibility to standardize the weight of metal items (here bronze tripods and cauldrons) that made it possible to define units of account based on weight-calibrated objects.

Beyond bronze, in the Archaic Greek world a specific metal-object currency development took place with iron items. To start with, like bronze items, various iron objects could also be used as units of account. According to various ancient antiquarian sources, this was the case for iron axes.⁴ This is confirmed by an inscription from the Cretan city of Dattalla, ca. 500 BC. The secretary and archivist in this city had to contribute for “ten axes

of dressed meat”, the axe being here clearly a unit of weight (JEFFERY/MORPURGO-DAVIES 1970 [SEG 27 631 and 1295], B l. 11-12). This also supposed a form of standardization of the weight of a (probably) iron axe.

Another specific development took place with iron spits. Like tripods and cauldrons, iron spits were indispensable for performing a sacrifice. They were used to roast the edible intestines and also the part of the meat that was not boiled (EKROTH 2014, 326). Bundles of iron spits (*obeloi*), or isolated spits, have been found in many of the most prestigious ancient Greek sanctuaries, including several of them located in the Peloponnese, such as, among others, the sanctuary of Hera at Argos and that of Artemis Orthia on the territory of Sparta (STRØM 1992). The iron spits were part of the inventories of the sanctuaries, but we also know for certain that they could be dedicated in sanctuaries, just like bronze tripods or cauldrons.⁵

In addition, several ancient traditions connect the *obeloi* with money. Starting from the late Archaic period, the most common monetary unit in Greece was the drachma, divided into six obols. In the entry of the *Suda* (a 10th century AD Byzantine encyclopedia), *s. v.* *dragme*, the word, which means “handful”, is defined as a unit of weight, based on the number of spits (six) a hand could hold. The *Suda* adds: “Formerly people used spits in lieu of coinage, and the amount it was possible to hold in a hand, they called it handful”.⁶ In fact, the six spits fit well with the duodecimal system used in Mesopotamia and largely adopted by the Greeks. Inscriptional evidence from the early 4th century confirms that “handfuls of small spits” appeared in the inventories of sanctuaries along with cauldrons, spits and other utensils used for the sacrifice.⁷ They fit perfectly with the bundles of spits from archaeological excavations, whether they too were parts of the kitchen utensils of the sanctuaries or whether they had been dedicated by some devotees.

Another testimony, that of Aristotle in the *Constitution of the Sicyonians*, establishes a link between the spits of the past and actual exchange: “As for the name of the obols (spits), formerly people used ox-piercing spits for exchange, a handful [drax] of which being conventionally called drachma. Transferred to their new uses, the names or the coins remained unchanged from their previous

5 See the dedication of iron spits by the famous courtesan Rhodopis at Delphi (early 6th century) Herodotus 2.135, and that of King Pheidon's at the Heraion of Argos, *Etymologicum Magnum s. v.* *ὀβελίσκος*. On these dedications, see KAPPARIS 2018, 316-321.

6 Suid, *s. v.* *δραγή*. τὸ παλαιὸν γὰρ τῶν ἀνθρώπων ὀβολοῖς κεκρημένων ἀντὶ νομισμάτων, οὓς τῇ χειρὶ δρᾶζαμένους, δυνατὸν ἦν, ἐκάλουν δραγήν. A similar comment was made by Aristotle, *Constitution of the Sicyonians*, see below. See in detail TOD 1960, 1.

7 Inscription from the territory of Thespiæ, in Boeotia: IThesp 38, l. 14; 39 (with the new edition IVERSEN 2010), frgt. 2, l. 2.

3 This was the case at Athens for the *Bouphonia*, EKROTH 2014, 332.

4 See the detail in JEFFERY/MORPURGO-DAVIES 1970, 144, with references to ancient sources: Eustathius p. 1878, 50 ad Od. 19.572 (the axe as a unit of weight in Cyprus and Boeotia); Schol. Ven. A, B and T in Il. 23.851 (the axe as a unit of weight in Boeotia); Hesychius, *s. v.* *σταθμῖον ἔξῃον <α> ἰαῖον* (the axe as a unit of weight in Paphos, Cyprus).

ones. Aristotle explains this in the Constitution of the Sicyonians...⁸ Another testimony, also from the 4th century BC, that of Heracleides Ponticus, a pupil of Plato, adds a further testimony: “First of all men Pheidon of Argos minted coins in Aegina and after circulating the coins and collecting the small spits (obeliskoi) he dedicated them to Hera in Argos.”⁹ As the story is told by Heracleides, when King Pheidon introduced coinage he also demonetized the spits, by dedicating them to the sanctuary of Hera. Dedicating an object in a sanctuary meant interrupting its circulation, for it would then forever remain the property of the gods: this was the case for the objects of value of the early Iron Age and the custom remained unchanged in the later period (PAPAKONSTANTINOU 2002). Furthermore, an Athenian law of the 4th century shows that dedicating a fake coin in a sanctuary also meant solemnly interrupting its circulation.¹⁰

From this and other sources, it is clear that in the 4th century thinkers and historians in mainland Greece commonly thought that King Pheidon had been the first to introduce coinage. In fact, they confounded the introduction of silver coinage in Greece, probably at Aegina, with the first introduction of coinage, which had taken place in western Asia Minor in the mid-7th century (on this question, see BRESSON 2012). To account for the transition from iron spits to silver coins they imagined a “demonetization of iron spits” in the form of the demonetization of fake and other demonetized coins of their own times. Whether “King Pheidon” really demonetized obeloi and dedicated them at Argos remains both unproved and doubtful. On this basis, should we really believe that in the past, iron spits had played the role of currency?

But a further element should be added to the dossier. At the beginning of the 4th century BC, the question was raised at Sparta whether the city should introduce foreign precious metal coins. It was finally decided it should not, for the city had its traditional currency which consisted in iron spits (on Spartan money, see FIGUEIRA 2002; CHRISTIEN 2002). Plutarch (Lycurgus, 9.1-2.), our Roman period source, emphasizes the difficulty to use

iron spits for the various forms of exchange. Objectively, as commodity money the obeloi were of too low value for large-value payments, and of too high value (and in addition uselessly cumbersome) for low-value payments (HODKINSON 2000, 160-165, for a discussion of the possible uses and form of Spartan iron money).

But does this really mean that they were a pure ad-hoc invention of those who opposed the introduction of precious metal coinage? This raises a question of admissibility: in order for the argument developed before the Spartan ephors to be valid, the iron spits must have had a form of validity reaching beyond the reasonings of Athenian intellectuals. Of Epaminondas, the famous Theban general, it is said that when he died in 362 BC he left in his house only one iron spit (Plutarch, Fabius, 27.2). This is of course one more pious legend. But it probably shows that in that city also the memory of this form of accumulation and circulation of wealth had not disappeared.

A further detail is provided about the Spartan iron spits used as currency. Starting from the Platonic dialogue Eryxias (399e-400c), from the end of the 4th century BC, a series of sources tell us that their metal had been previously made useless by an addition of vinegar (Plutarch, Lycurgus, 9.2; Lysander, 17.2; [Plato], Eryxias, 399e-400c.). In other words, these iron obeloi could not be reused as metal. They were no longer a commodity money, whose value would have been that of its market value as a good. The Spartan iron spits had been transformed into a form of fiat money. The point is all the more interesting that the author of the Eryxias, a follower of the Platonic school, wrote in the spirit of Plato and thought that money (or rather its material form) was pure convention. The Spartan iron spits were compared to the sealed leather bags of the Carthaginians and to the engraved stones of the Ethiopians: in other words, the Eryxias took the Spartan iron bars as one more form of fiat money, not of commodity money (BRESSON 2012).

4. Bronze in pre-Roman and Roman Italy

For centuries, starting in the early 1st millennium BC, bronze was used as money by the various indigenous people of Italy in the crude form of lumps of bronze, what modern scholars, following Pliny (n.h. 33.43), define as *aes rude* (VECCHI 2013; WOYTEK 2014, 201). Despite the fact that the chronology proposed by Pliny for the various phases of Roman money cannot be accepted, this is not the complete imagination of an antiquarian. Archaeological finds from hoards and votive deposits of central Italy confirm the existence of irregular lumps of bronze that were used in the form of money.

At least as early as the 6th century, in Etruria and in Emilia under the control of the Etruscans, there circulated bars of bronze with a highly ferruginous

8 Aristotle fragt 481 + 580 Rose (Pollux 9.77): Τὸ μέντοι τῶν ὀβολῶν ὄνομα οἱ μὲν ὅτι πάλαι βουπόροις ὀβελοῖς ἐχρῶντο πρὸς τὰς ἀμοιβὰς, ὧν τὸ ὑπὸ τῇ δρακί πληθος ἐδόκει καλεῖσθαι δραχμή, τὰ δὲ ὀνόματα καὶ τοῦ νομίσματος μεταπεσόντος εἰς τὴν νῦν χρῆσαν ἐνέμενεν ἐκ τῆς μνήμης τῆς παλαιᾶς. Ἀριστοτέλης ταῦτόν λέγων ἐν Σικυωνίαν πολιτείᾳ. See also Plutarch Lysander 17.3, who admits that in the past people used either iron spits or bronze in lieu of coinage.

9 Ὀβελίσκος· πρῶτος δὲ πάντων Φεῖδων Ἀργεῖος νόμισμα ἔκονεν ἐν Αἰγίνῃ καὶ διαδιδούς τὸ νόμισμα καὶ ἀναλαβὼν τοὺς ὀβελίσκους ἀνέθηκε τῇ ἐν Ἀργεὶ Ἡρᾷ. On the other sources relating to Pheidon, and to its alleged coinage minted at Aegina, see KAGAN 1960.

10 Dedication of fake coins to the shrine of the Mother of the gods in Athens; RO 25; AIO 819, ll. 10-13, 375/374 BC. For an example of coin recall and introduction of new ones in the same period, see Aristophanes Assemblywomen (ca. 393-391 BC), v. v. 815-822.

alloy, the so-called *ramo secco* bars (BURNETT 2012). This modern Italian name is based on the dry branch design that was imprinted on them. The weights of *ramo secco* bars do not correspond to a standard. At some point (5th century or later?), the Roman state introduced its own bronze bars, called *aes signatum* (“stamped bronze”) in the modern literature, again following Pliny. The various designs imprinted on the bars, the leaded bronze of their alloy, for some the legend ROMANOM, and their weights corresponding to Roman standards of weight differentiate them from the *ramo secco*, although in the 3rd century both *ramo secco* and *aes signatum* could be mixed in hoards. Rome also introduced large bronze cast disks, or *aes grave* (“heavy bronze”), with two standards on the basis of the Roman pound, with six subunits, which later formed the basis of the designation of Roman coinage when bronze itself was abandoned as official Roman money.

The detail of the history and use of Etruscan, Italian and Roman bronze money, from the simple chunks of metal to the more sophisticated *aes grave* (of course itself inspired by the developments of Greek precious metal coinage) is still far from being totally clarified. But what is certain is that a series of institutional interventions can be observed in the evolution of bronze as money in the Italian peninsula. Being of relatively high value, these objects could perfectly be dedicated to the gods (MURGAN 2014), a feature already met in both the Armorican-type socketed axes from Brittany and in the Greek iron spits.

Above all, metal analyses reveal that the Italian and Roman monetary bronze had a composition that differed sharply from the standard bronze alloy, based on copper and tin, in the usual ratio *ca.* 9/1.¹¹ For the *aes rude*, various samples provide contrasting results. In one case, from five pieces of *aes rude* from Lake Fucino (Italy), we have almost pure copper for four items (up to 100 %), while in the fifth has a proportion of 7 % iron (MASCELLONI *et al.* 2011, 609, tab. 11). Another analysis of 12 chunks of this metal, from Terrasabis, Sardinia, reveals an average ratio of 75 % copper, 20 % iron, with negligible additions of other metals, such as lead below 3.5 %, traces of zinc and tin \approx 0 % (INGO *et al.* 2004, 90, tab. 1). Other analyses both of *aes rude* and *ramo secco* items show very similar composition for the two types of objects, with tin ratios always below 1 %, but with a lead ratio varying from \approx 0 % to *c.* 7 %. By contrast the *aes signatum* has a metal composition similar to that of the first Roman cast coinage of the 3rd century, with a tin ratio of *ca.* 4–7 % and a lead ratio up to 30 % (WESTNER *et al.* 2020b, fig. 2).

Once again, we observe for Rome and Italy metallic compositions that differ from that of the standard bronze objects. For *aes rude* and *ramo sec-*

co, the absence of tin is remarkable. In some cases, the items are of pure copper, while in others there may be significant additions of iron or lead. The *aes signatum* has an alloy with a high lead percentage, similar to that of the later Roman bronze coins. From the end of the 4th century onwards however, the monetary history of Rome and Italy took a new turn with the new minting of silver coins, the decisive break taking place with the introduction of the denarius during the Second Punic War (WESTNER *et al.* 2020a). Until then, bronze money with an often-non-negligible fiduciary element had been the standard currency of the Italian peninsula.

Metal-object currency before coinage in Western Eurasia

Despite the chronological and geographic differences, the four cases coming from Western Eurasia have common features. In each of them a metal, bronze or iron, that had a distinct practical use was for this reason considered to be a valuable good. The qualities of these metals, their divisibility, portability and durability (of course to various degrees) paved the way for using them as currency. In exchange processes, chunks of metal could be weighed according to a standard. This in some way fits ideally with the notion of commodity money.

However, one can also observe another type of development, which contradicts the notion of pure commodity money. This is the case with the creation of objects made of these metals with shapes that replicate or imitate that of commonly used tools, but which in some way diverge from them, as is the case with the small bronze axes of western Bronze Age Europe or the axe-shaped iron ingots of early medieval central Europe. In addition to their shape, the metallic composition of these objects could also separate them from similar objects made of standard alloy. This was the case for the leaded bronze of the small axes of western Bronze Age Europe, for the Spartan iron spits of Classical Greece, for which added vinegar made their metal improper for any normal use, and for the *aes grave* and *ramo secco* of the Italian peninsula in the Late Iron Age and Early Republican periods.

Thus, instead of taking care of keeping metal in its form of commodity money, these societies created specific monetary instruments that were inspired by this concept but diverged from it. A trend towards a relative standardization of the weights of the objects fabricated specifically to be used as money can be observed. The large (sometimes very large) accumulations of these items and the fact that in the three cases out of four (this does not apply to Italian and Roman bronze money) they could be tied by links supposes they were meant to be counted rather than weighed. Whereas met-

11 See for example the composition of the bronze disks from Lake Fucino, MASCELLONI *et al.* 2011, 609, tab. 11.

al was originally used as money purely on the basis of its weight, which is the principle of a commodity money, it came also to be used under a specific shape and often a specific alloy, which separated it from its ordinary use-value. The metal of the specially fabricated objects was thus reduced to its role as money. The creation of what was in fact a form of fiat money was probably operated by a progressive process of trial and error. As for Sparta however, it is clear that if the system of the iron spits was first introduced by common consensus, it was later imposed by law in the specific form of fiat money.

This raises another question, which is that of the reason motivating the creation of these specific objects, the use-value of which was now to only be a medium of exchange. Igor KOPYTOFF (1986) has observed that the process of commoditization involved more complex social processes than usually envisaged. He notes that a slave was ordinarily sold only once, but that he or she “was unambiguously a commodity only during the relatively short period between capture or first sale and the acquisition of the new social identity” (KOPYTOFF 1986, 65). Of course, as he himself notes, a slave could be resold, and even several times. Besides, the slave was an asset, accounted for as such in the property of his or her master. But it remains that the remark describes well the process of commoditization of slaves. It is also of special interest for it puts the emphasis between the circulation of ordinary objects and money. In our world, in an immense majority of cases a commodity is sold only once: this is the case for most petty objects that we use. It could be true also in the ancient world, although less so, for the conditions of scarcity were such that every bit of an item that was out of use in its original form could still have a form of value. Some commodities admittedly, have a longer history of sales than others: Kopytoff cites the example of cars in Africa today and we could think of houses in western societies. But it remains that comparatively the only commodity that in principle may experience an unlimited number of exchanges for profit is the commodity used as money.

But creating a metal-object currency, as it is defined above, meant creating a good that was designed to circulate *ad infinitum*. It is only when these objects were dedicated to gods in sanctuaries or other sacred places that their circulation came to a stop. The motivations behind the creation of these metal-object currencies may have varied. They may have corresponded to processes of simplification of the use of money, such as it was the case after the creation of precious metal coinage as commodity money, with the introduction in the mid-5th century BC of small change bronze fiat money (see RUTTER 2012 and below on the context). They may also have corresponded to a desire to limit the circulation of another type of money, such as commodity money, as was the case at Sparta when the state wanted to ban the use of gold and silver and,

officially (the reality was different) refused to introduce precious metal commodity coinage, which would have disturbed the ultra-inegalitarian and conservative social system of the city. To sum up, fiat metal-object currencies may have functioned in parallel to commodity money systems, or may have been exclusive of them. But, in all cases, these objects stood halfway between full commodity money and full fiat money, in a “grey area”, as well put by François R. VELDE (this volume). Their implementation meant also enforcing a restrictive bond among people who would use these strange objects.

China and Western Eurasia

China has been initially proposed as a benchmark to test the situations observed in Western Eurasia. The comparison proves in every respect worthy of making. On both sides, one observes the use of specific alloys that separate metal when it is used as currency and when it is used in an ordinary context for weapons, vessels or tools. The heavily leaded alloy of the Chinese hackbronze can be paralleled to the ferruginous alloy of some of the Roman and Italian *aes grave*, while the quasi absence of tin in the *aes grave* and *ramo secco* also shows a desire to separate them from regular bronze. Both the Chinese spades, hoes and knives on the one hand, and the Armorican-type socketed axes from Brittany on the other had a high lead content, which once again separated them from ordinary bronze and prevented any attempt from non-specialists to melt them down and reuse them as regular bronze. This of course was also true of the metal of the Spartan iron spits, to which vinegar was added to make sure that it could not be reused as ordinary iron.

On both sides one also observes the fabrication of miniature objects that mimic traditional tools, spades, hoes and knives in China, axes in Brittany at the beginning of the Iron Age, but which are simply symbolic for a use as a normal object. These objects, the Chinese miniature spades, hoes and knives, like the Armorican-type socketed axes from Brittany or the much later Moravia and southern Poland iron ingot axes could be threaded on a wire or on a string to form bundles, and accumulated in large numbers. The Archaic and Classical Greek iron spits could also be tied together. Obviously, this characteristic implies that these objects were primarily meant to circulate by tale rather than by weight, even if in some cases their weight may have likely have played a role (as was the case for the Chinese *banliang* coins and their successors). The similitudes between the development of bronze currencies in China and bronze and iron currencies in Western Eurasia are so striking that it must be admitted that each of these societies in their own respects faced the same challenges and reinvented solutions that were perfectly similar. In this sense, there is a true parallel between the two worlds.

Yet at some point they diverged. In Western Eurasia, an exogenous phenomenon, the availability of massive resources in gold and silver, opened new possibilities (SCHEIDEL 2008, 276-278; ROSS *et al.* 2020 for sources of precious metal in the Aegean region). In the Levant and Mesopotamia, we know that money circulation first took the form of hacksilver, that is of chunks of silver that were weighed and adjusted to the price that had to be paid. The detail of the history of hacksilver is not linear and has its own complexities, linked to the level of the precious metal supply and the purity of the alloy (HEYMANS forthcoming). But it remains that between the 10th and the 6th century BC weighed silver obviously played an increasing role in transactions.

Then, on the west coast of Asia Minor, first with the minting of electrum coins starting *ca.* 650 BC (KERSCHNER/KONUK 2020; BRESSON 2020), and then, before 550 BC, with the minting of separate gold and silver, a radical innovation intervened that even more deeply separated the monetary history of the West from that of China. As observed, the Chinese banliang and wuzhou coins certainly had a metal value significantly below their official value, but in a ratio (around 41 % if the parallel with the Tang period is accepted) that still conferred to the coin a non-negligible metallic value. However, in terms of the value of the metal, there is nothing that can be compared to the case of the electrum coins from Lydia and the Greek cities of western Asia Minor and the neighbouring islands, which were made of a pure alloy of gold and silver, precisely defined for each series (BLET-LEMARQUAND/DUYRAT 2020; GITLER *et al.* 2020). Similarly, the later silver and gold coins of the main mints of the Classical and Hellenistic world were commonly of the purest alloy, over 95 %, sometimes over 98 %.¹² It was only in the case of cities finding themselves temporarily in financial difficulty (like Tarentum in the early 3rd century BC: BUCCOLIERI *et al.* 2014), of small cities minting for a regional market only, or of imitative coinages (BARRANDON/BRESSON 1997, for the comparison between genuine Rhodian coins and their imitations) that the precious metal purity dropped. But even in these cases, the proportion of precious metal remained commonly over 80 % or 90 %. With this caveat, it remained that western precious metal coins were really commodity money, whose value was indexed on their market value.

Thus, with the increasing role of precious metals as money and then with the creation of precious metal coins, the monetary history of China and that of Western Eurasia diverged sharply and for

a long period (for the challenge posed by the use of mainly base metal money until the Song dynasty, between 960 and 1279 AD, see VON GLAHN 1996, 48-50). Any attempt to question this radical difference is in vain. This dissimilarity had huge consequences in terms of differential financial organization, both for the state and for individuals. It is only with the bronze coins, which were first introduced in the mid-5th century BC in western Greece (RUTTER 2012) and which supplemented the precious metal coins for small change, that some kind of parallel with the Chinese bronze coins can be reintroduced. Besides, there existed some common features that for us make it possible to bring together the Chinese bronze coins and the western precious metal coins. Even if the former were cast and the latter minted, they shared the characteristic of being pieces specifically defined according to a weight standard, as had been the case for the former monetary objects both on the Chinese side with the spades and knives, and bronze axes on the European side, but this time with a much greater precision. They also shared the characteristic of being legal tender in a certain territory and that of being used by tale rather than by weight. Despite sharp differences, the constraints that had already been at play for the earlier phases of monetary history were still present when the coinage systems were developed.

This suffices to show that money and the use of money must be studied over the *longue durée* (RAHMSTORF 2016). Money has a history and did not remain unchanged overtime. The introduction of the first coinage around 650 BC in Lydia and the Greek cities of the littoral of western Asia Minor is one of these transformative episodes, just as it was later the case with the creation of negotiable bills of exchange by the medieval bankers and with the creation of a national debt system in both Holland and Britain, thus paving the way for modern forms of money. But continuities and similarities can also be observed that confirm that the same methods of analysis can be applied to different societies and to different periods. The existence of metal-object metal currency with striking similarities both in China and Western Eurasia before coinage is concrete evidence of this fact.

Abbreviations

IThesp	Roesch, P., Les inscriptions de Thespies, online edition (Lyon, update 2009).
AIO	Attic Inscriptions Online, https://www.atticinscriptions.com/ (accessed 03.11.2020).
RO	Rhodes, P. J., Osborne, R., Greek Historical Inscriptions 404-323 BC (Oxford 2007).
SEG	Supplementum Epigraphicum Graecum (Leiden 1923-).

12 Archaic Athenian silver "owl" tetradrachms: DAVIS *et al.* 2020; Alexander tetradrachms minted in Macedon: KALLITHRAKAS-KONTOS 2000; Ptolemaic early silver tetradrachms: KANTARELOU *et al.* 2011; Seleucid silver tetradrachms from various mints: ALINEZHADA *et al.* 2019; Ptolemaic and Seleucid gold coins: DUYRAT/OLIVIER 2010.

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The infinite silver of Xenophon

Money and growth in Classical Athens

by GARETH DALE

Ancient Greece, coinage, growth, limits, Solon, Xenophon

In this essay I look for glimpses of growth ideology in Classical Athens, a society in the throes of monetisation. I ask whether the Ancient Greeks knew, in any meaningful sense, the growth paradigm – by which I mean the proposition that economic growth is good, imperative, essentially limitless, and the indispensable remedy for an array of social ills. The sources from which I prepare the argument commence in the Archaic period with Hesiod, and move on to Solon, Sophocles, Aristophanes, Xenophon and Aristotle. Through textual analysis I explore changing attitudes to wealth and accumulation in a society experiencing the expansion and diffusion of all-purpose money and coinage.

Forming the core of the essay is a discussion of Xenophon's belief that silver mining opened a path to the infinite expansion of wealth. In this sense of money's limitlessness do we see a premonition of what in modernity became the growth paradigm? Perhaps. However, the economies of Classical Greece were not seedbeds of growth ideology. Xenophon's silver was intended for the polis, and not for continual reinvestment in capital accumulation.

Das unendliche Silber von Xenophon. Geld und Wachstum im Athen der klassischen Zeit

Antikes Griechenland, Münzen, Wachstum, Grenzen, Solon, Xenophon

In diesem Aufsatz suche ich nach Einblicken in die Wachstumsideologie im klassischen Athen, einer Gesellschaft, die sich im Umbruch zur Monetisierung befand. Ich frage, ob die alten Griechen das Wachstumsparadigma, mit dem ich die Aussage meine, dass wirtschaftliches Wachstum gut, unerlässlich, im Wesentlichen grenzenlos und das unverzichtbare Heilmittel gegen eine Reihe sozialer Übel ist, in irgendeinem geeigneten Sinne kannten. Die Quellen, mit denen ich die Argumentation vorbereite, setzen in der archaischen Epoche mit Hesiod ein und gehen weiter zu Solon, Sophokles, Aristophanes, Xenophon und Aristoteles. Durch Textanalyse untersuche ich die sich verändernden Einstellungen zu Reichtum und Akkumulation in einer Gesellschaft, welche die Expansion und Diffusion von Allzweckgeld und Münzen erlebte.

Den Kern des Aufsatzes bildet eine Erörterung von Xenophons Überzeugung, dass der Silberbergbau einen Weg zur unendlichen Expansion des Reichtums eröffnete. Sehen wir in dieser Wahrnehmung der Unbegrenztheit des Geldes eine Vorahnung dessen, was in der Moderne dann zum Wachstumsparadigma wurde? Vielleicht. Doch die Wirtschaft des klassischen Griechenlands war nicht die Keimzelle der Wachstumsideologie. Xenophons Silber war für die Polis bestimmt und nicht für eine kontinuierliche Reinvestition in Kapitalakkumulation.

Introduction

In this essay I shall look for glimpses of growth ideology in Classical Athens. It was a society undergoing economic and cultural ‘efflorescence.’ I borrow the term from Jack GOLDSTONE (2002), to refer to phases of social development that witness a relatively sharp uptick in several economic and demographic indices, including population growth, per capita income, urbanisation, and trade. Such efflorescences, and the declines that invariably follow, were a common feature of social dynamics from the earliest times through to modernity. My focus will be on the Classical age (480–323 BCE), but the ‘efflorescence’ – of Athens, of Greece – had begun in the preceding Archaic period (800–480 BCE), manifested in the expansion of population, markets, and the invention of coinage and abstract philosophy. These, and kindred developments in China, India and elsewhere, began to loosen shackles of rank and status, and fostered habits of calculation, measuring, and weighing means and ends, all of which, we may speculate, stimulated the spirit of rational inquiry (GRAEBER 2011). Certainly in Greece, there is evidence of a fascination with processes of becoming and change – and growth.

Drawing on writings by Xenophon and other philosophers (and a playwright or two) of Classical Athens, and on a framework developed by George Derwent Thomson, Alfred Sohn-Rethel and Richard Seaford, I shall look for ingredients of growth ideology, including the fetishisation of silver, the lust for gold, and the limitless desire for wealth in a society in the throes of monetisation. And I shall ask whether in any meaningful sense growth ideology was known. As I use the phrase, growth ideology, or the growth paradigm, refers to the proposition that economic growth is good, imperative, essentially limitless, and the indispensable remedy for a range of social problems. To explore these issues, let us briefly begin with the Archaic beginning.

Homer’s heroes, Solon’s *horoi*

In early Archaic times Greece was a ‘heroic society,’ with weak states and strong warlords, each with his entourage of retainers and tied to the others by alliances and rivalries. Peasant households produced largely to meet their needs, with lords (*basileis*) extorting part of their produce. In contrast to societies with strong central states that set down frameworks of rules, recognition and monetary value, public recognition between groups and individuals took the form of gift exchange, often ceremonial in character. Given the prevalence of war, and the tendency of gift exchange to turn into “games of one-upmanship” institutionalised in great public contests, the prevailing ethic was competitive (GRAEBER 2011, 117; ROSE 2012).

Did this extend to accumulation? It hardly could, given the special-purpose character of money. In the Homeric poems there is no mention of money or rural-urban trade, while long-distance maritime trade was reserved principally for luxury items and was monopolised by elites. In the *Iliad* and the *Odyssey*, David SCHAPS (2008, 40) tells us, prices are quoted in oxen, “but trade is simple barter, mediated neither by oxen nor by anything else.” For payments of damages “there is no single medium, but the guilty party must estimate what sorts of gifts will appease the victim.” As stores of value, “bronze tripods are the most popular item, though when one wants to state the value of a tripod one evaluates how many oxen it is worth.” The Homeric heroes did pursue plunder and possessions and, if we follow Moses FINLEY (1962, 137, 142), they did so with “a calculating, almost niggardly hoarding and measuring and counting.” Odysseus said that returning home with more wealth will render him “more respected and lovable to all men” (quoted in ROSE 2012, 215). But in this world prior to all-purpose money, the limitless desire for wealth, and certainly the limitless accumulation of it, was absent. Wealth took concrete form. For the upper echelons, the purpose of accumulation was to oil the wheels of reciprocity, to maintain social networks and buttress social status, not acquisition chiefly for the sake of more (FINLEY 1962, 142; SEAFORD 2004).

Reflections on accumulation are found in the poems of Hesiod, a yeoman farmer who lived between the 8th and 7th centuries. In *Works and Days*, one of the earliest known texts on ‘economics,’ we find mention of a spirit in some individuals’ hearts that “yearns for riches” (HESIOD 1988, l. 382). This is an ethos to be cultivated through labour, and not, as in the Homeric legends, through plunder. The acquisitive mentality, that saw “neighbour vie with neighbour as he hastens on the road to wealth” is to be greeted, because it encourages the work ethic (HESIOD 1988, l. 23).¹ The signature tune of *Works and Days* is the refrain that individuals should “work, work upon work” (HESIOD 1988, l. 382). This is no exaltation of labour, as is sometimes supposed. Labour, rather, is a punishment sent by the gods for Promethean overreach, a burden that eternally oppresses humanity (HESIOD 1988; cf. SEDLACEK 2011, 96). The tone is stoic. The burden is humanity’s fate, the source of all that is good. It must be embraced, and idleness condemned. Hesiod was repelled by what he regarded as the torpor of the work-shy and impecunious classes. Conversely, those who toil, diligently pursue their tasks, seek self-sufficiency and regularly “lay down even a little on a little” will see their granaries become “full of sustenance in its season” (HESIOD 1988, l. 302–364). Their wealth will grow, and with it will come renown and excellence (*kudos* and *aretē*).

1 BROWN (1947, 60) reads Hesiod as an opponent of acquisitiveness, but this is a misinterpretation. Hesiod draws a line between good and bad forms of greed.

Works and Days is an instructive text in several ways relevant to my argument. First, it is an early defence of the individual work ethic, but it is one that appears in a distinctive light when we recall that Hesiod was a slave owner – his own task was principally the *supervision* of work. Second, it links the work ethic to the injunction to accumulate. It presents wealth accumulation as a recognised social telos, but one that in its organisation is a matter for individual farmers (with, *sotto voce*, the help of their hired hands and slaves). In a realm of scattered subsistence households the limits to accumulation were clear and sheer (ROSE 2012, 40). Exchange took the form of gift-giving and barter, and the wealth that labour created is portrayed as the contents of a granary – its limits are the barn walls (SEAFORD 2004, 88).

Those granaries filled unevenly. *Pace* Hesiod, this was less because some farmers rose at dawn while others idled than a function of the irregular division of cultivable land and slave ownership. With the growing leverage provided by money and credit the gap widened further. During the 7th century, wealth, notes the Classical historian Peter ROSE (2012, 63), “became less the symbolic capital of numerous dependants and barns full of agricultural surplus and increasingly capital in the ‘money-form.’” In parts of Greece, including Athens, the Archaic age saw special-purpose monies, such as iron spits, give way to all-purpose money (SCHAPS 2008, 40). Some historians date the transition to the adoption of coinage while others, such as John KROLL (2008), argue that it began earlier, with the use of bullion. By the time of Solon (*ca.* 630–560 BCE), uncoined silver was being used for measuring and storing wealth, for payments and for interest-bearing loans. I find Kroll’s case persuasive, but, either way, the direction of travel is clear: by the onset of the Classical period, special-purpose money was being pushed to the margins.

As wealth came to be measured in silver, the dynamics of accumulation changed. Silver is compact and imperishable, allowing the wealthy to amass an indefinite quantity, and to store it indefinitely. Simultaneously, “it became both easier and more disastrous for the poor to borrow.” (Antony Andrewes, quoted in ROSE 2012, 53). Debt peonage exploded. Where the aristocracy had previously received tribute from smallholders in the form of ‘gifts,’ during the 7th century this relationship hardened, and became defined by the transfer of a definite share of production, or even rent (REDFIELD 1986, 50). Relations of extortion were partly supplanted by lines of credit. Smallholders who found themselves obliged to borrow often found their control of their land, their labour, even their wives and children, passing into the hands of creditors. For the poor, money carried the allure of independence, but it could easily turn into the opposite. It brought the unsettling prospect of one’s children being transported “to the homes of repulsive

strangers,” in GRAEBER’s (2011, 85) unembroidered phrase, in order to carry out forced labour under sufferance of “every conceivable form of violence and abuse, possibly for years, conceivably forever.” The peasant’s servitude was made publicly visible by the placing of a boundary stone (*horos*) that proclaimed his indebtedness to a noble patron or other creditor.

The reduction of much of the population to a servile status was a prominent factor in two of the transformations that Greek society experienced in the 7th and 6th centuries. One was its remarkable colonising thrust. This was driven by population growth but also by peasants fleeing debt bondage and outright enslavement (ROSE 2012, 140). The other, in Attica, was the class conflict that prompted Solon, the lawgiver and poet, to enact his reforms. From the fragments of his poems that have survived, it is apparent that he believed Athens to be in peril. “Unprincipled mob-leaders” had encouraged “avarice” (SOLON 2008, 4). Frugal moderation had been elbowed aside by the lust for gold. The earth itself, Solon lamented, bore witness to the consequences: her breast scarred with *horoi*, the pillars of debt-bondage. In his verses he describes how he removed the *horoi*, emancipating those who had been enslaved (SOLON 2010, poem 36 l. 6–7).

Several aspects of the Solonic episode are striking. The Athenian statesman is the first Greek on record – and, to my knowledge, the first person – to have referred to the boundlessness of money and the desire for wealth. Of “wealth,” he said, “no limit’s laid down clear for men. Since those among us who possess the most strive to earn double.” (SOLON 2008, 13; *cf.* SEAFORD 2004). That limitlessness of the desire for gain, he stresses, is to be mistrusted. Culpability for the crisis lies clearly at the door of the reckless rich, those who have earned their wealth unjustly. Yet he is (or at least appears to be, given the inevitable semantic uncertainties in these fragments), reproachful towards the demands, and perhaps even the avarice, of the poor. According to Maria NOUSSIA-FANTUZZI (2010, 480), his references to the *demos* are suffused with the assumption that it must be restrained from rebellion, and he is committed to the notion that “the *demos* must be regimented by someone else” – that someone else belonging of course to the well-to-do layers from which Solon himself came (NOUSSIA-FANTUZZI 2010, 489). He presented his actions as protective of the interests of both the rich and the “commons,” preventing either side gaining privilege beyond what is rightful (SOLON 2008). With this censuring of the voraciousness that he witnessed among the upper *and lower* classes, Solon helped to originate an influential Athenian discourse on greed and limits that I trace further below. He presented himself as the mediator of disputes who would hold his “shield” around both factions (SOLON 2008), the reconciling political leader who championed justice in the form of “Respect for

Law” as the antidote to the disruptive instincts of hubris, lust, and envy.

Finite cake, infinite dough

The abolition of debt bondage was manifestly in the interests of the poor citizenry. It helped their efforts to form and participate in the self-governing democratic community. But Solon’s reforms were intricate in their ramifications. They occurred at a time of monetisation and commercialisation. The Greek city-states of the 6th century have a strong claim to be the first societies in history to be *permeated* by the use of money (SEAFORD 2006, 148). By loosening the grip on government of the aristocrats of the great *oikoi*, Solon’s reforms served to enhance the role of the rising commercial elite in management of the *polis*. Meanwhile the abolition of debt bondage expanded contractual tenancy and the monetisation of economic relations. These developments were sharply accelerated, a generation after Solon, by the invention of coinage (VON REDEN 2010).

With the possible exception of China, Greece was the first location in which people used money in much the same way as today, as a state-issued currency functioning as a universal and guaranteed form of exchange and with large-scale use of coin (SEAFORD 2006, 3, 145). Introduced to mainland Greece in the second half of the 6th century, coinage spread rapidly. There is widespread agreement among historians that the Archaic *poleis* coined money in order to make disbursements for buildings, mercenary troops and the like, *i. e.* “because of the logic of politics, not the logic of gain” (Colin Kraay, quoted in MORRIS 2002, 16). Some historians, such as Edouard Will, emphasise motivations of distributive justice behind the innovation, with coinage an expedient developed by tyrants to redistribute confiscated property of the rich among a broader public. Relatedly, Leslie KURKE (1999, 13) suggests that it arose in response to a crisis of justice. In a context framed by the political empowerment of the demos, populist tyrants and democratic leaders challenged the unequal distribution of property and the old system of hierarchical gift exchange by promoting markets and coining money. These led to an erosion of the gift economy, as services to the *polis* began to be paid in wage form. Others, notably Rose, insist that the ruling class was the principal beneficiary of monetisation, for it did away with impediments to their amassing of wealth. Yet he too finds that monetisation discommodated traditional elites. In enabling the option of an “unlimited accumulation of wealth in non-agricultural surpluses, a social hierarchy which the aristocracy desperately sought to base on birth (and implicitly on land-ownership) was subjected to a potentially frightening new vulnerability” (ROSE 2012, 53).

We should at this point delve a little deeper into the consequences of monetisation, for they went far beyond the ‘economic.’ It opened up the idea of infinite accumulation, it precipitated a crisis of traditional order the outcome of which was a new discourse of ‘limits’ and an ethic of ‘self-sufficiency,’ it gave wings to Athens’ economic-imperial expansion, and it spurred the emergence of abstract philosophy. I begin with the latter, on which I follow the line of argument developed by Thomson, Sohn-Rethel and Seaford.²

The monetisation of the Greek *poleis* in the 6th and 5th centuries, SEAFORD (2004, xi) proposes, catalysed “a radical transformation in thought that is, in a sense, still with us.” An aspect of this was the sharpening of consciousness of society’s separation from its natural surrounds. From commodity production and the monetary economy in Ancient Greece, according to SOHN-RETHEL (1978, 71), arose the concept of nature “as a physical object-world independent of man.” A second element was the budding of a new individualism. Money promotes a sense of the autonomy of the individual economic actor – if you have it, your dependence on reciprocal relationships with others is less immediately apparent (SEAFORD 2004, 293). In this regard, it is instructive to compare texts from Homeric Greece with those of the Classical period. In the former, human action is either presented as the normal, expected pattern, or, where not, as steered by divine intervention. Homer, according to FINLEY (1962, 152), “has no word for an act of deliberate choice or decision.” Classical Greeks, by contrast, knew sophisticated reflections on ethical autonomy, and with a strong sense that moral virtue depends on individual behaviour. A third part of the transformation concerns abstraction. A coin’s conceptual properties, notes SOHN-RETHEL (1978, 59), are that it “conforms to the postulates of the exchange abstraction” and that it is supposed, among other things, “to consist of an immutable substance.” An awareness of the increasing abstraction of exchange relations, he suggests, irrigated the work of the Greek philosophers, from Thales to Aristotle, and stimulated the development of abstract, conceptual modes of reason. As SEAFORD (2004, 149) puts it, money is an “embodiment of the absolute abstract equivalence between commodities imposed by exchange” and is therefore homogenous and able to become the universal means – and even purpose – of economic action. Once again, the contrast with the Homeric world is suggestive. Its heroes were “unable to visualize any achievement or relationship except in concrete terms.” Every quality had to be translated into some specific symbol: honour into trophy, marriage into gifts, friendship into treasure, and so on (FINLEY 1962, 143). Money’s universal fungibil-

2 Thomson *et al.* are, in essence, taking a general finding from the sociology of money, that money promotes a distinctively abstract, rational and impersonal mentality, and excavating its origins in antiquity. See BROWN (1952).

ity – and with this we come to the final part of the transformation – underlies the *unlimited* character of its attractive power and, potentially, of the desire for it. Money facilitates the hunger for wealth, enabling a generalising and sharpening of the acquisitive mentality. When goods can be exchanged for money, SEAFORD (2004, 157) explains, “they may appear homogenous because *pervaded* by it.” And inasmuch as “the purpose of the exchanges may be monetary gain, an aspect of the pervasiveness of money may be the pervasiveness of monetary gain.” We are familiar with the limitlessness and universal desirability of money, but it was new to the Greeks (SEAFORD 2009).

Evidence of an awareness of the transformative effects of monetisation, and interrogation of the concept and purposes of wealth, abounds in philosophy, and in theatre. By way of illustration consider Sophocles’ *Antigone*, in which King Creon highlights the threat that money posed to established hierarchies. He accuses the disruptors of social order of having sold their souls, and charges money with being the greatest of curses. “No institution has so harmed humanity as the creation of money,” he blazes (SOPHOCLES 2005, l. 295-301). “It’s destroyed even cities, it has expelled men from their homes, it teaches the minds of honest men to deviate and take up foul things. It has shown men how to be villainous and to know every sort of godlessness.” Aristophanes likewise depicts the eponymous protagonist of his comedy, ‘Wealth,’ as unlimited and omnipotent. Wealth is far more powerful than Zeus himself, for the authority even of the father of the gods ultimately rests on money (ARISTOPHANES 2001, l. 128-131). In the same play, wealth is portrayed as the root of avarice (when men become rich “they show wickedness absolutely beyond measure”) and as blind, in explanation of the observation that so many who deserve to be rich are in fact poor and vice versa (ARISTOPHANES 2001, l. 77-109). One dialogue, notes SEAFORD (2009), highlights that “whereas one can have enough sex, or loaves, or music, or dessert, or honour, or cakes, or manliness, and so on, money is different: if someone obtains thirteen talents (a lot of money), he is eager for sixteen, and if he obtains sixteen he swears that life is unbearable unless he obtains forty.”

The other key source of knowledge on the confrontation of the Greek mind with money is of course philosophy. Aristotle’s discussion of wealth is well known. His concern is with the virtuous management of *oikos* and *polis*. In either arena, for virtue to flourish a sufficient supply of material goods is indispensable (ARISTOTLE 1905, 259; CARTLEDGE 2009, 125). He discusses economic behaviour in its two forms: *oikonomia*, management of the *oikos*, and *chrēmatistikē*, the art of acquiring goods, or wealth (from *chrēmata*, “things of which the value is measured by currency” (SEAFORD 2004, 148)). Crucial to mastery of the art of

wealth acquisition is to understand the differentiation of true wealth from false, and its corollary: the natural and unnatural forms of exchange. For example, the charging of interest is unnatural because it treats money as an end in itself, in contravention of its natural purpose – as if metal were a living thing that could bear fruit (FINLEY no date; GRAEBER 2001). In usury, money, although not a living creature, acquires the capacity to breed – with the effect, on individuals, of encouraging insatiability at the expense of craftsmanship and public activity (SKIDELSKY/SKIDELSKY 2012, 75). *Chrēmatistikē* is essential, but strictly as the acquisition of wealth necessary for, and ministering to, the household. In this conception, wealth is understood as an instrument useful to life; it enables citizens to live virtuously, and the unequal distribution of wealth and property is essential to that.³ To see wealth as a means by which to achieve other ends is to indicate its ‘natural limit’ (ARISTOTLE 1905, 258; DESROCHES 2014).⁴ For Aristotle the excellence of wealth lies, as HÉNAFF (2010, 84) explains, “in its finite and limited character and in the fact that it precisely fulfils the needs and well-being of the *oikos*.” True wealth, then, is “associated with property, which is to say ownership of either a domain that one cultivated or any other set of instruments of production,” such as the artisan’s workshop or the householder’s slaves. At the point at which the *oikos* is provided with the wherewithal that is the condition of its patriarch’s freedom, enabling him to achieve the good life, further acquisition is unnecessary and immoral (Scott Meikle quoted in DESROCHES 2014, 4; cf. MEIKSINS WOOD/WOOD 1978, 234). If the moral and political conditions able to sustain a wise and comfortable life in a well-run household and polis have been satisfied, “growth beyond that is meaningless” (LIANOS 2011). Property is understood not as an end but as a means to help achieve the virtuous life, and economic growth therefore is not, and cannot be, an issue for analysis (MATHIE 1979, 6). For Aristotle, in short, virtuous economic behaviour centres on the utilisation of property in moderation. This is the way to achieve the good life, in contrast to behaviour that is oriented to mere living, the satiating of desire without consideration of natural limits. This latter road is unnatural, in that it knows no limit, it encourages temptation and excess. He links this to a misconception rooted in retailing and coinage,

3 To my knowledge, Karl Polanyi was the first person to grasp that *chrēmatistikē* in Aristotle’s *Politics* refers to two things at once: the art of administering a domestic unit (*oikos*) and the art of acquiring *chrēmata*, things that are useful for one’s existence (money included). What Aristotle condemns is not *chrēmatistikē* in the first sense but in its second and particular sense: accumulating money beyond the needs of the maintenance of *oikos* and *polis*. See GODELIER (1986, 199).

4 A similar attitude is present in Pericles’ Funeral Oration: “We regard wealth as something to be properly used, rather than as something to boast about” – in THUCYDIDES (1972, 143-51).

namely the idea that wealth is ultimately a *quantity of money*. King Midas, he reminds us, prayed that everything around him turn to gold. His death by starvation ensued (ARISTOTLE 1905).

Xenophon's inexhaustible treasure

For Aristotle, trade and acquisition (*chrēmatistike*) must serve the proper and natural goals of human flourishing and economic self-sufficiency. To push them further, to treat commerce and money-making as ends in themselves, is inexcusable. Economic accumulation for its own sake is inexcusable. But one can find glimpses of a more positive attitude to limitless accumulation and even, in an embryonic sense, infinite growth. The material basis for this was, in general terms, monetisation, and in particular the commencement of silver mining at Laureion and the dynamics of financial and territorial accumulation that it unleashed. Silver mining was Athens' most exploitative industry: wholly reliant on slaves, who were subject to atrocious conditions and treatment (ROSE 2012, 40). It was also its most growth-oriented one, its rhythms closely connected to investors' expectations. From studies of mine-leasing records, Kirsty SHIPTON (2001, 143) has shown that wealthy Athenians preferred to invest in mining, with its potential for greater profits, above even land. The Laureion mines were at the heart of the Athenian economy and empire; the silver these slaves extracted enabled their Athenian owners to replace them as they ailed or died with new captives to send down the mines – as well as into agriculture, domestic service and other industries (BRESSION 2014, 60).

The Laureion bounty provided a prodigious boost to Athens' coffers and propelled the Attic drachma to its hegemonic position as *the* currency of the Eastern Mediterranean (VON REDEN 2010). Athens' expanding empire brought further influxes of slaves and tribute, and new silver mines. For its elites, virtuous circles followed. Slavery, imperial tribute and silver mines combined to produce monetary and commercial supremacy. Commercial expansion, through the stimulation of shipping, required naval superiority, which in its turn sustained imperial expansion – as well as generating domestic demand in Athens when naval crews returned from campaigns. In this context it is perhaps unsurprising that silver could appear as an elixir of growth.

The most luminous discussion of Athenian silver, in this regard, is found in Xenophon's *Poroi*. In this text, known also as 'Ways and Means' and 'Revenues-Sources,' the author offers advice to Athenian leaders, suggesting how they might ensure the city's financial self-sufficiency. He pays particular attention to silver, and decodes the Laureion mines as a sign of divine favour. Silver, he explains, adheres to a unique economic logic. In other industries, when the number of sellers grows the

price of commodities falls and production is found to be "unprofitable" (XENOPHON 2018, 180). In agriculture, every farmer knows exactly "how many yoked teams suffice to work their land, and how many workers as well," and to send any more into the field would be considered "a loss" (XENOPHON 2018, 180). With silver, by contrast, the purchase of more slaves leads to the discovery of more ore, which in turn invites more mine owners to come in, putting more slaves to work.

In explaining silver's uniqueness, Xenophon draws a comparison with furniture. Whereas a householder, when well provided with tables and chairs, will shop no further, "no one ever yet acquired so much silver that he no longer needs more," and if anyone possesses "a vast amount, they take no less pleasure in burying the excess than in using it" (XENOPHON 2018, 180). In further demonstration of its magic, silver enjoys high demand when "cities are suffering, either from the dearth of crops or from war, and with their land becoming idle," for at such times it can be used to purchase "provisions," but equally, when cities are faring well, "people strongly desire silver; for men wish to spend it on beautiful armour, good horses, houses, and magnificent furnishings," while women expend it on apparel and ornaments (XENOPHON 2018, 180). The silver veins, he notes further, do not reduce in scope but are "always stretching out further" and whenever people dig into the vein, it "is revealed to be many times" greater than thought (XENOPHON 2018, 179). From these properties of silver, Xenophon infers that Athens' mines "will never run out and silver will never lose its value" (XENOPHON 2018, 180). Hence his recommendation to the *polis* that it invest massively and continuously in the silver industry – in exploring for new seams, and in acquiring more slaves to work the existing ones. This will guarantee future prosperity.

It is *Poroi's* policy proposals that tend to receive scholarly attention. Some underscore its recommendations for the encouragement of the settlement of immigrants in Athens (JANSEN 2012). Others draw attention to its geopolitical agenda: Athenian politico-economic self-sufficiency will enable it to establish a consensual regional hegemony, rather than a belligerent empire geared to the coercive extraction of tribute (DILLERY 1993; SCHORN 2012). Still others highlight its proposals for raising revenues by expanding silver mining, noting that the fact that the mines were state property, their proceeds distributed to the *demos* as an economic dividend, permits the inference that Xenophon's previous hostility to Athenian democracy had diminished (FARRELL 2012). But what for our purposes is most remarkable about *Poroi* is something else: its fetishism of money. How does Xenophon reach the conclusion that the silver mines can never be exhausted, and that silver can never depreciate? Because silver is a special commodity. Tapping into the supposition

(discussed above) that the demand for money is boundless due to man's insatiable appetite for *khṛēmata*, Xenophon surmises that the supply of silver must be equally unlimited. It is this assumption that underpins his strikingly growth-oriented programme – for expanding the supply of slaves to work ever more mines, for developing commercial activities in the port of Piraeus, and so on.

The radical insight contained in *Poroi*, in the view of the Virginia classicist John DILLERY (1993, 9), is that domestic economic growth represented a viable alternative to revenue expansion through war and plunder. After all, the Greek city-states in Xenophon's time (430-354 BCE) were experiencing a commercial revolution. Local markets and foreign trade were thriving, and in locations such as Delos and Rhodes one could find, in Karl POLANYI's (2001, 56) depiction, "emporion of freight-insurance, sea-loans, and giro-banking compared with which the Western Europe of a thousand years later was the very picture of primitivity." Some have gone further than Dillery, proposing that Classical Athens provides history with the original model of an institutional arrangement conducive to economic growth, resting on private property, democratic politics and a market economy (BITROS/KARAYIANNIS 2010). The case, presented most bluntly by the Athenian economists George Bitros and Anastassios Karayiannis, rests on a comparison of Athens with its rival, Sparta, in 490-338 BCE. Sparta relied on the brutal exploitation of the helots. Its institutional order suppressed "the natural urging of human beings to amass wealth." Its expansion therefore required conquest. Athens in contrast pioneered a capitalist economy in which free labour was the source of growth (BITROS/KARAYIANNIS 2006; 2010). While Sparta stagnated, Athens prospered, thanks to its citizens' work ethic and the "great institutions of private property, democracy, and free markets" (BITROS/KARAYIANNIS 2010).

That something is amiss in Bitros and Karayiannis' analysis is immediately apparent from their erasure of slavery. They mention it, but briefly, and in the form of awkward apologia. Slavery "may reflect badly on Athens, if looked through the lenses of present day views." Athenian policy did at least permit "ample (!) leeway for the economic and social advancement of slaves." Athenians "encouraged the economic and social advancement of all males (free citizens, metics and slaves) through industriousness and entrepreneurship" (BITROS/KARAYIANNIS 2010).

There is of course no inherent incompatibility between the use of unfree labour on a large scale and accumulation-oriented capitalist modes of production, as the North Atlantic of the 17th through 19th centuries shows. But Classical Athens was not that. In downplaying the role of slavery, Bitros and Karayiannis cannot adequately characterise Athens' growth dynamics. Several of its

main economic sectors relied heavily on unfree labour. This was above all mining and the rural estates, but, even apropos manufacturing, upper-class Athenians, such as Xenophon, took it for granted that any profitable large-scale establishments had to rely on slave labour (DE SAINTE CROIX 1981). The fact that war was a major source of the supply of slaves, helped ensure that imperialism was knit tightly into the economic organism. Slavery was a major driver of Athenian imperial expansion and of Athens' growth spurts, yet, at the same time, it placed constraints on the secular expansion of market activity: it limited the extent of market-mediated demand for means of subsistence, it placed obstacles to labour mobility, and it suppressed incentives to innovate (BRESSON 2014, 63).

In the light of the above, one can begin to see why a thinker such as Xenophon, while welcoming and urging the growth of certain economic particulars (the wealth of the landowner, the maximisation of the city's tax revenues), did not formulate a version of growth ideology in anything remotely resembling the form in which it appears today. Markets in his Athens were not constituted as an interconnected economic space – as was exemplified in the division of *agora* and *emporion*, and in the high degree of political regulation of both these sites (BRESSON 2014, 55). It follows that he could not conceive of the economic processes that he discusses as facets of an interconnected 'economy' that is capable of growth. His understanding centred instead on the economic arts of the *oikos*, on command and management (FOUCAULT 1985; MIGEOTTE 2009, 64, 174).

In Xenophon's philosophy we find an awareness of the growing aristocratic interest in commercial gain, and a fascination with silver, but this is tightly wrapped within an altogether traditional outlook, one that affirms limits against the new limitlessness. The contradiction of limitlessness and its antithesis, as Seaford has proposed, first arose in Ancient Greece, as monetisation shook up received aristocratic values based on land ownership. Trading was not viewed as an elevated profession, as is underscored by the fact that in Athens and the other Greek *poleis*, according to DE SAINTE CROIX (2004, 353-357), "no single statesman is known to have been a practising merchant, and no merchant is known to have played a prominent part in politics." Solon listed trade under the activities to which men may be driven if propertyless and under the compulsion of poverty (DE SAINTE CROIX 1981, 130). Substantial segments of market exchange were displaced onto subaltern groups: slaves, metics, and women. Bankers were often manumitted slaves, their social status was not high. Two of them, Phormion and Pasion, are known to have achieved citizenship, but it is telling that when Pasion, the richest man in Athens, was accorded that status he immediately invested his

capital in land. The ruling class regarded hands-on commercial enterprise as incompatible with their notions of citizenship and aristocracy, and with their attitude to labour (Cartledge quoted in ROSE 2012, 134). That Hermes doubled as the god of commerce and thievery speaks volumes. Philosophers viewed commerce with some suspicion, on the grounds that, in PLATO's (1997, 1392) words, it "breeds shift and deceitful habits in a man's soul, and makes the citizens distrustful and hostile." The pursuit of profit for its own sake was regarded as a threat to the stability of the social order.

Thus in Xenophon we find reproaches of those who pursue gain as an end in itself. He understands wealth in terms of use values which, to count as wealth, must be deployed with skill and virtue. In other ways, too, his conception of growth contrasts sharply with the growth paradigm today. One concerns the *heterogeneity of ends*. Xenophon's advice is directed to leading statesmen. Their duty is to make the state prosperous (or 'εὐδαιμον', a term that is conventionally translated as happiness but more accurately designates well-being, including material sufficiency (SCHORN 2012, 699)). But that goal must not be overridden by money-making. Relatedly, his objective is not the expansion of the 'economy' as such. Neither he nor his contemporaries possessed the concept of an economy in the sense of an analytically separable sphere of human interaction that could be described in detail, and in abstraction from governmental acts and from micro-economic decisions about the household (FIGUEIRA 2012, 665). Moses FINLEY (1973, 19) goes so far as to claim that in Xenophon "there is not one sentence that expresses an economic principle or offers any economic analysis, nothing on efficiency of production, 'rational' choice, the marketing of crops." This is an exaggeration. Xenophon, who has been described as "the earliest extant managerial guru" (a Peter Drucker for the gentleman landowners of the day (FIGUEIRA 2012, 684)), does indeed possess a management consultant's eye for questions of competition and its effect on prices, and he offers numerous proposals for improving the organisation of agricultural and artisanal production. Indeed, Adam Smith found inspiration in his discussion in *Cyropaedia* of the advantages of a specialised division of labour (FIGUEIRA 2012, 667, 683). Nonetheless, the tenor of his discussion of the division of labour is that it enables punctual improvements in the quality and quantity of output, with no sense that this is the central material dynamic of an ongoing process of productivity growth (LOWRY 1979, 65-86). Moreover, he, and Plato, were doing more than writing paeans to elite rule or offering business advice to the landowning aristocracy. Their writings on economics have to be understood first and foremost as ethics and rhetoric – indeed, as ideology. They were quite prepared to condemn commercialism and usury, but this principally through commentaries on money and acquisitiveness.

The *oikos* versus the oiks

The monetisation-inspired clash between cultures of limits and limitlessness intersected with another great collision of Classical Athens: of property *versus* democracy. For Athenian elites, the control of the regional money supply, attendant upon the silver mines, enhanced their geopolitical power and personal wealth. At the same time, money threatened to bring independence to the lower classes too – especially when services to the *polis* in newly democratic Athens began to be paid in wage form. Money tended to support the constitution of citizens as autonomous agents with the capacity to collectively construct interests that were antithetical to those of the aristocracy (NAFISSI 2004, 404). It found its true home in the *agora* – which, as a site of commercial *and* political intercourse and litigation, embodied the democratic principle that politics should be practised in public and in the city, in contrast to the traditional order in which politics was played out privately, in the great aristocratic households. And money democratised desire. Insofar as everyone wanted it, everyone, "high and low, was pursuing the same promiscuous substance" (GRAEBER 2011, 190). For traditional elites, this was upsetting the anointed social order. Money injected a boundlessness into the desire for wealth, it threatened the social grammar of moderation, and of respect for existing social boundaries. For all that, however, the aristocrats were well placed to bend the powers of money to their ends. They howled that monetisation had thrown traditional hierarchies into disarray, and yet, as GRAEBER quips (2011, 189), "the thing that really seemed to bother them about money was simply that they wanted it so much."

In an era of simultaneous monetisation and democratisation, Athenian aristocrats faced a problem: the democrats were castigating them for their greed. The charge could not be rejected out of hand, for the evidence was legion. Instead, philosophers, Plato and Xenophon to the fore, sought to resolve it by means of a different strategy. To simplify a little, when the aristocracy found its interests threatened by democracy, political philosophy was born. Socrates, Plato, Xenophon and Aristotle saw in philosophy a tool with which to reinvent and revitalise the values of the nobility, without falling in with the reactionary atavists who wished society to be governed again by ancestral custom. The goal was to stem the levelling tide of democracy, the tyranny of the majority, and the tawdry commercialism that they felt were engulfing Athens, but while retaining those tantalising prospects that 'silver' was making available (MEIKSINS WOOD/WOOD 1978, 3).

Take for example *Oeconomicus*, Xenophon's manual for the landowning nobility. In it, he discusses wealth, through a dialogue between Socrates and the wealthy businessman Critobu-

lus. In general terms the passage honours landowning. The xenophonic Socrates reserves his highest praise for landowning farmers, these noble gentlemen who practice agriculture as a leisure pursuit, for the fortification of the body and the refinement of the soul (DE SAINTE CROIX 1981, 121). Mother Nature, he assures his interlocutor, trains those who till the soil “in a wrestling school of her own,” while landowners “whose devotion is confined to the overseeing eye and to studious thought, she makes more manly,” rousing them at dawn and inspiring activity of the mind and body (XENOPHON 2008). Even a king will find profit in agricultural pursuits, for they conjoin the satisfaction of improving one’s estate with that “training of physical energies” which is necessary for the ruler to successfully respond to the challenges of his position (XENOPHON 2008). Landed property, the dialogue emphasises, is the true form of virtuous wealth.

Economics, the two friends agree, is the branch of knowledge concerning the “enhancement” of the value of man’s possessions, with possessions defined to include “those things which the possessor should find advantageous for the purposes of his life” (XENOPHON 2008). For Xenophon’s Socrates, a possession only qualifies as wealth if it has use value. (“Wealth is that, and that only, whereby a man may be benefited” (XENOPHON 2008; cf. Plato’s Socrates, in PLATO 1997, 614-618)). Wealth as exchange value, money, should not be “reckoned as wealth” (XENOPHON 2008). He goes on to remark that although in material terms Critobulus is incomparably richer than he, in reality he, Socrates, is wealthier. His income is “amply sufficient” to meet his needs and desires and enable a virtuous life, whereas his friend, given his appetite as well as the liturgies and ostentatious lifestyle expected of someone of his position, is in truth “singularly poor” and “would be barely well off” even if his possessions thrice as great (XENOPHON 2008).

What is Xenophon doing in this passage? First, he is depicting his friend and teacher Socrates as a model of aristocratic self-restraint – in a counterblast to his democratic detractors. Second, by identifying the elite with the values of prudence and self-restraint, Xenophon was elaborating, as BALOT (2001, 232) has suggested, “a paradigm for contemporary aristocrats that recreated the aristocratic self-image in the face of the newly energised democratic ideology. ... While accepting the democracy’s accusations of greed against some aristocrats, Xenophon develops a counter-image of the morally virtuous aristocratic leader, the leader who deserves political prominence because of his appropriate relationship to wealth.” Throughout *Oeconomicus*, Xenophon depicts the true gentleman as he who is capable of self-discipline, a trait that enables and legitimates his command over others (HIGGINS 1977, 28).

Plato, Xenophon’s contemporary, follows a similar angle of attack. His Socrates is an exemplary soul, in that he sees wealth as neither essential nor even necessarily helpful in achieving the good life. He epitomises the virtuous elite, that small echelon of “highly educated men of rare natural talent” who steel themselves “to moderation when assailed by various needs and desires” (PLATO 1997, 1572). When offered the chance “to get a lot of money,” PLATO (1997, 1572) continues, “it’s a rare bird that’s sober enough to prefer a modest competence to wealth. Most people’s inclinations are at the opposite pole: their demands are always violent demands, and they brush aside the opportunity of modest gain” if they see the opportunity for “insatiable profiteering.” In the *Republic* he carries the case to its logical conclusion, voicing a suspicion of money and wealth as corrosive of virtue, and denying all private property to the philosopher-kings of that utopia (FINLEY 1973, 36). The point, I submit, is strategic. Plato is justifying aristocratic domination through the device of portraying the model aristocrat as a paragon of self-discipline. Superficially, his critique of greed carries a socialist or ecological ethical resonance. But in its context it should be read as a core element of Plato’s conservative critique of the feckless demos: of their redistributive and levelling impulses and the consequent danger that democracy will reduce all human endeavours to the same acquisitive impulse (MEIKSINS WOOD/WOOD 1978, 234). Look for instance at the prominent place in his work (and likewise Xenophon’s and Aristotle’s) of *pleonexia*. Some equate the term with greed and ambition, the desire for more wealth and power. But that is too simple. It combines these meanings with the idea of individuals getting *more than they deserve*, acquiring property that rightly (by custom or tradition) is held by others, and submitting to passions rather than reason. In the context of Plato’s critique of democracy this deployment is strategic, much as was Solon’s kindred case discussed above (notwithstanding the absence of *pleonexia* from his lexicon). Against the democrats’ accusation that the aristocrats are greedy, Plato replies that, while some may be bad apples, their social layer as a whole is the very repository of reason and admirably immune to *pleonexia*. In essence: ‘The temple of greed isn’t our *oikos*, it’s your *demos*.’

Conclusion

The societies of Ancient Greece knew substantial growth, and economic innovation – notably the invention of coinage. The impact of monetisation and coinage on multiple dimensions of material life and consciousness was explosive. As Thomson, Sohn-Rethel and Seaford have argued, it helped to give birth to philosophy and, later on, to political philosophy. But the philosophers, and the

aristocrats more broadly, viewed money with ambivalence. On one hand, they reviled it as a prostitute, fastening itself indiscriminately to whichever hand will take it, oblivious to rank or virtue (KURKE 1999; see also WRAY 2004, 236-237). On the other, it enabled new frontiers of accumulation to appear – from which they stood to gain the most.

Monetisation stimulated both a new type of acquisitive mentality and philosophical inquiry into economic management. Xenophon helped establish *oikonomia*, a branch of knowledge whose purpose is the virtuous management of the *oikos* and the increase in its wealth, and he flirted with the idea that silver mining opens the way to the indefinite expansion of treasure for the *polis* (MIGEOTTE 2009, 34). Arguably, one can see the latter, a sense of money's potential limitlessness, as an ingredient of what in modernity became the growth paradigm. But the economies of Classical Greece were soils in which growth ideology could not root. Rulers were, naturally, concerned with revenue, but with their own prestige, power and wealth in mind, and with no sense that sustained per capita economic growth or increasing their subjects' prosperity should be targets to which economic policy should aim – or indeed targets at all (*cf.* MANNING 2007, 459; 2010, 121, 203; VAN DER SPEK 2007, 433). Xenophon's silver, let's recall, was intended for the *polis*, and not for continual reinvestment in capital accumulation. Money and markets were central to only some sectors of material life, and economic activity did not appear to its participants, or to the philosophers, as a universal and unified system of exchange. An ornate ethics of personal improvement may have been present among Athenian elites, as Foucault has anatomised at length, but it was not matched by any similar ethic of technological improvement in production, nor was science systematically applied to technological innovation (BRESSON 2014). The idea that wealth, considered in the abstract, is a (let alone *the*) core goal of social production would have made little sense to denizens of that world.

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Metal money before coinage in the Aegean, ca. 1400-600 BC

by JULIEN ZURBACH

Aegean, Bronze Age, Iron Age, gold, coinage, hacksilver

The importance of weighed metal money (hacksilver and other metals) not only in the Near East, but also in the whole Mediterranean, before the advent of coinage, is only beginning to be fully recognised. There are still many ongoing discussions as to the characteristics, the functions and the level of circulation of this kind of money, as well as its relations to other systems of measuring and exchanging wealth, including coinage. This paper concentrates on the Aegean, but by placing it in its Mediterranean context I try to approach some wider economic and monetary dynamics. It is argued here (1) that weighed gold money played a role in the Mycenaean economy outside the palatial sphere, notably in the exchanges with the Near East and Egypt, and that this was a part of the wealth of Mycenaean elites; (2) that gold continued to play a role in the Iron Age down to the 8th century at least; (3) that the introduction of silver as money pre-dates the introduction of coinage and played an instrumental role in shaping the new economies of emerging city-states, notably slavery; (4) that all these developments can be paralleled with processes known in the Near East and Egypt. The invention of coinage, far from being an economic, social and cultural revolution, is seen here in a continuum with an already widely monetised economy.

Metallgeld vor der Münzverwendung in der Ägäis, ca. 1400-600 v. Chr.

Ägäis, Bronzezeit, Eisenzeit, Gold, Münzgeld, Hacksilber

Die Bedeutung von gewogenem Metallgeld (Hacksilber und andere Metalle) vor dem Aufkommen von Münzgeld wird allmählich nicht nur für den Vorderen Orient, sondern für den gesamten Mittelmeerraum voll anerkannt. Viele Fragen zu dem Charakter, den Funktionen und dem Umfang des Umlaufs dieser Art von Geld sowie hinsichtlich seiner Beziehungen zu anderen Mess- und Austauschsystemen von materiellem Wert, einschließlich der Münzprägung, werden zurzeit noch diskutiert. Der Schwerpunkt dieses Beitrags liegt auf der Ägäis, aber indem wir diese Region in ihren mediterranen Kontext stellen, versuchen wir, die umfassenderen wirtschaftlichen und monetären Dynamiken zu fassen. Es wird argumentiert, (1) dass gewogenes Goldgeld in der mykenischen Wirtschaft außerhalb des zum Palast gehörigen Bereichs von Belang war, insbesondere im Austausch mit dem Vorderen Orient und Ägypten, und dass dieser einen Teil des Reichtums der mykenischen Eliten erklärt, (2) dass Gold auch in der Eisenzeit bis mindestens ins 8. Jahrhundert v. Chr. bedeutend war, (3) dass die Einführung von Silber als Geld vor der Einführung der Münzprägung erfolgte und eine entscheidende Rolle bei der Gestaltung der neuen Volkswirtschaften der aufstrebenden Stadtstaaten, vornehmlich bei der Sklaverei, spielte und schließlich (4) dass all dies mit Entwicklungen im Vorderen Orient und in Ägypten parallelisiert werden kann. Die Erfindung des Münzwesens war unseres Erachtens weit davon entfernt, eine wirtschaftliche, soziale und kulturelle Revolution gewesen zu sein, stattdessen ist sie in dem Kontinuum einer bereits weitgehend monetarisierten Wirtschaft einzuordnen und zu verstehen.

Recent research has made it imperative to go back to the fundamental distinction between money and coinage, to be found in almost every handbook on economics. Coins are money (at least in their normal use) but they are not the only form for money which should be expected by archaeologists and historians. This paper will try to illustrate this point with material from the Aegean through the Late Bronze Age, Iron Age and Archaic period (*ca.* 1600 to *ca.* 500 BC) and place it in its Mediterranean context. The scarcity of the documentation contrasts with the available material from, for instance, the Levant and Mesopotamia. Hence, it is not easy to present a synthesis – or better a global view – on money in all its forms from the Late Bronze Age to the beginning of the Archaic period in the Greek world. Another factor of difficulty in drawing a general view of the question is the dynamism of very recent research which constantly changes the picture, even if all new data and analyses are directed in one and the same direction: the importance of weighed, non-coined money for the societies of the Late Bronze Age and later.

1. Preliminary considerations: Money and coinage

Until recently, as far as the history of monetary means in the Aegean is concerned, the following points were considered quite obvious: the invention of coinage was viewed as a complete revolution, and quite often, explicitly or not, it was confused with the invention of money. Therefore, all societies pre-dating *c.* 580 BC, the traditional view for the beginning of coinage in Lydia and Ionia (LE RIDER 2001), now revised to the late 7th century by work on the Artemision contexts at Ephesos (KERSCHNER/KONUK 2020) were considered pre-monetary, and it was assumed that the rapid spread of silver coinage in the last third of the 6th century was an economic, social and even cultural revolution. It was also assumed that these pre-monetary societies were using systems of direct equivalencies between goods, as for instance oxen and other objects in Homeric poems, double axes (*pelekeis*) in some regions where Archaic inscriptions were referring to them as late as the 5th century (Crete), and complex systems of equivalencies between grain, wine, wool and other products in the Mycenaean palace-administered economy (PARISE 2000; NICOLET-PIERRE 2002, 83-108).

The importance of weighed silver as money in Archaic Greece, however, has been recognised since some 20 years, thanks to a series of contributions by John KROLL (among others 1998; 2001; 2008; 2011), followed up by Raymond DESCAT (2001, 2006b; see below for details) in his reflections on the economic history of Archaic Greece. In the conclusions of a special issue of the *Revue Numismatique*, Jean ANDREAU (2001) argued that historians

and archaeologists should abandon the notions of pre-money or proto-money, which is often a correlate of the semi-conscious identification of money with coinage. Andreau argues that these notions lack any precise definition and that an approach through the functions of money (measure of value, storage of value, mean of payment) would be more precise. As a matter of fact, even if the distinction between money and coinage is widely acknowledged, particularly in France where an article by Edouard WILL (1954) has made it very clear, we tend to consider everything before coinage as pre- or proto-money, and consider pre-coinage monetary forms as something incomplete. Teleology is never very far away in those matters. To sum up quite roughly, Andreau was also arguing in favour of a critical approach to binary oppositions, which is particularly pertinent to Archaic Greece. One example is the idea of a gift-giving economy: some authors have criticised the notion that gift-giving functioned as the main element defining the whole economy of Early Archaic Greece, and that it progressively dissolved in favour of more abstract, less personal, forms of exchange and accounting (see the review article by DE CAL-LATAÏ 2001; ZURBACH 2010). On that point, we will only underline that gift-giving also needs accounting, and that it is not *per se* hostile to monetary means. A more diversified view of the Archaic economy in the Aegean is based on the notion of spheres of exchange, defined by different tools of evaluation, storage of value and payment; a clear case often seen in ethnography are the wedding gifts (DESCAT 2001; 2006b, with literature).

Two observations have to be added here. The first is that monetary questions, as others, cannot be correctly analysed if they are seen only in an isolated Greek world. It is essential to understand that the movement of research we just described is part of a wider tendency which places weighed metal money at the heart of the monetary and economic history of the Near East, the Mediterranean and Europe. It is part of a general movement in research, from Iberia and Europe (GARCÍA-BELLIDO *et al.* 2011; BRANDHERM *et al.* 2018; POIGT 2018; 2020) to the Near East (JURSA 2010 for Babylonia in the 6th century; GASPA 2016 for the Neo-Assyrian empire; VARGYAS 2002/10 and AGUT 2014 on Egypt, *etc.*) and of course the Levant, on which recent work, notably by HEIJMANS (2018; in press), ESHEL (2014) and ESHEL *et al.* (2018), give a most welcome update.

A second important observation is that metal used as money while defined only by quality and weight, not as coinage, has been well known to earlier economists and economic historians of diverse theoretical backgrounds. Let us quote two passages from John M. KEYNES' *A Treatise on Money* (1930, I, 12; see LEROUXEL 2015, 118).

“When the kings of Lydia first struck coins, it may have been as a convenient certificate of fineness and weight, or a mere act of ostentation appropri-

ate to the offsprings of Croesus and the neighbours of Midas. The stamping of pieces of metal with a trade-mark was just a piece of local vanity, patriotism or advertisement, with no far-reaching importance" (...). "It was not necessary, therefore, that talents or shekels should be minted [*i. e.* coined]; it was sufficient that these units should be state-created in the sense that it was the state which defined (with the right to vary its definition from time to time) what weight and fineness of silver would, in the eyes of the law, satisfy a debt or a customary payment expressed in talents or in shekels of silver".

Coinage is therefore in Keynes' perspective certainly not a fundamental step; the important steps he identifies in the global history of money are the introduction of metal money, and then the introduction of what Keynes calls representative money, what we call fiduciary money (for him, paper money with no material value at all). Fiduciary money is a somewhat complex notion, since coinage is in fact always fiduciary, from the very moment that it introduces a distinction between material and nominal value. This point, however, lies beyond the scope of this article and is more related to the bronze coinages in Greece (GRANDJEAN/MOUSTAKA 2013; esp. DESCAT 2013, 187).

Economists and sociologists from such different orientations as JEVONS (1875, chap. 4-6) and SIMIAND (1934) agree on the fact that weighed metal money is a fundamental step in the long-term history of money, perhaps more important than the invention of coinage. Furthermore, GRAEBER (2011, chap. 8) has also given all due place to weighed, non-coined metal money in his global history of debt. Already ARISTOTLE (*Politics* 1257a 35-41) did fully recognise the importance of weighed metal money:

"The various necessities of life are not easily carried about, and hence men agreed to give and receive in their mutual exchanges something which was intrinsically useful but also easy to transmit for the purposes of life, for example, iron, silver, and the like. Of this the value was at first measured simply by size and weight (*μεγέθει καὶ σταθμῷ*), but in process of time they put a stamp upon it, to save the trouble of weighing and to mark the value."

This passage represents only a short observation in Aristotle's theory of money, and is rarely commented upon, or only in a general perspective on the role of metallic value in his conception of money, as opposed to Plato's chartalism (SCHUMPETER 1954, 59-61; MEIKLE 1995, 87-109). One may ask whether this idea stems from a pure theoretical construction on the evolution of monetary forms, or from some historical sources or contemporary evidence available to Aristotle. It is difficult to prove that Aristotle had an idea of the use of weighed metal money in ancient times, but it remains probable.

How can one integrate these new perspectives into our reconstruction of the history of Antiquity?

2. Three stages in Greek monetary, pre-coinage economy

As a specialist of the Greek world, I will concentrate here on three stages in the pre-coinage monetary systems of the Aegean.

Mycenaean gold as money

The Mycenaean economy has long been considered a quite centralised palace-controlled economy, known through administrative texts. This organisation, as we know, has close parallels in the Late Bronze Age Eastern Mediterranean, from Anatolia to Syria and Egypt, and there are numerous works underlining the pertinence of parallel features, Ugarit being the most widely used point of comparison; others may well be as promising, notably Hittite Anatolia. It is now, however, clear that the palace does not organise nor register the entire economy, and we tend nowadays to underline the role of rural communities, semi-independent merchants, *etc.* At the time of MOSES FINLEY's (1957) and KARL POLANYI's (1960) first attempts at a global interpretation of the Mycenaean economy based on recently deciphered Linear B texts, most of them from destruction levels of c. 1200, it seemed clear that this centralised economy worked in a completely non-monetary way, with equivalencies being established directly between goods, in kind (for a general view on Mycenaean economy and the place of the palace, KILLEN 1985). It was assumed that this was sufficient to cope with the necessities of a redistributive economy, without market exchange.

There was, for sure, an elaborate system of direct equivalencies connecting a wide range of commodities, whose value was measured in kind (detailed view of the question in SACCONI 2005). The bulk of Linear B texts being economic and fiscal, a thorough analysis of the variations in fiscal obligations, for instance, can reveal some aspects of the underlying system of accounting in kind. This has been done in a most detailed and convincing way by PIA DE FIDIO in her book on *I dosmoi pilii a Poseidone* (1977). On the basis of fiscal texts with contributions in many different items for each contributor, she arrives at the following equation, expressed with the conventional transcription for Mycenaean ideograms: HORD 24 = NI 12 = FAR 4 = VIN 4 = OLE 2 = ME+RI 1, which means: 24 units of barley = 12 units of figs = 4 units of flour = 4 units of wine = 2 units of oil = 1 unit of honey (DE FIDIO 1977, 110). None of these commodities seems to assume the functions of a universal equivalent. Two texts from Pylos in Messenia show, however, that this kind of equivalence did not only function as a tool for the fiscal administration but was also a mean of payment. Tablets PY An 35 and PY Un 443 show quantities of alum being acquired through payment with wool, goats, skins, wine, and figs in the first case, wool and skins in the second. These texts are,

again, purely administrative, not contracts or anything bilateral. They register only the quantities of goods given in exchange for alum, not the quantity of alum itself; their objective is to register what has been taken out of palatial storage rooms, and in this sense, they are documents internal to the palace. Only for the sake of clarity did the scribe explicitly state that this was “for the acquisition of alum”. This point also makes clear that the alum was really paid for, in both cases, through these groups of quite diverse items. The transaction almost certainly included someone outside the palace as provider of alum, a product which may come from far away, and almost certainly outside the palace’s territory.

Of course, this has not prevented Mycenologists from looking for some kind of metal money. When Mycenologists address the question of money, they normally think of the use of weighed silver in the Near East. A wealth of cuneiform texts, like the Codex Hammurabi, the other law codes from the 2nd millennium, the state archives from Ebla and Ur (3rd millennium BC), the merchant archives from Kültepe Karum Kanesh (early 2nd millennium BC) (DERCKSEN this volume) or private archives from

Neo-Babylonian times, provide extensive evidence that silver was used as money. The problem is that silver is almost absent from Linear B texts: *a-ku-ro* ἄργυρος is attested only one time, as an ornament for a chariot wheel (PY Sa 287). There is also a possibility that a new ideogram, recently recognised as different from the long-known ideogram for gold, might represent the commodity “silver”. If this hypothesis is right, and I think it is, then some of the metal vases registered as offerings in a Pylian tablet (PY Tn 316) are made of silver (see below on the question of the two variants of ideogram *141). But that is all: no hacksilver can be identified in Linear B texts. But the situation may be different if we look for hackgold.

I have argued elsewhere that the search for weighed silver as money has prevented us to recognise the use of weighed gold as money (ZURBACH 2017b; 2018a). Let us summarise the argument. The essential source on this matter is the Pylian tablet PY Jo 438, which records contributions in gold from a series of persons. This text is quoted in the yellow box and an attempt at a translation follows.

(only remaining fragment of the introduction) the *ko-re-te* [districts chiefs]

(list of contributors) *te-ko* [and *e-re-ta* [proper names? or professional groups, builders and rowers?] (should give) M 1 and N 1 of gold; one *po-ro-ko-re-te* [district chief in second] (should give) N 2; Dorikhaos the *mo-ro-qa* [title: he who has land?] (should give) N 1; Lyros the *mo-ro-qa* (should give) [probably] N 1; Nedwatas and Echemedes [known as military commanders] (should give) [quantities lost]; the *ko-re-te* for Lousoi (should give) P 4 [or more]; the *ko-re-te* for Sphagianes (should give) P 4 [or more]; the *ko-re-te* for Aphaia (should give) P 5; the *ko-re-te* for Charadros (should give) P 5; [lines 13-17 are difficult; one *ko-re-te* on l. 13, one *mo-ro-qa* on l. 17]; Alkhawon (should give) P 3; the *po-ro-ko-re-te* for Helos (should give) P 3; Aggelos the *qa-si-re-u* (should give) P 3; *te-po-se-u*, the *ko-re-te* for *ti-nwa-ta*, (should give) N 1; Poikilops [known as a military officer] (should give) N 1; *au-ke-wa* [a high functionary] (should give) N 1; the *ko-re-te* for *ti-mi-ti-ja* (should give) P 6; *i-te-re-wa* [place-name] (should give) P 6; *pi* *82 [place-name] (should give) P 6; the *ko-re-te* for *e-ra-te-re-wa* (should give) P 6; the *ko-re-te* for *a-ke-re-wa* (should give) P 5. (On the left side) *po-so-ri-jo* the *po-ro-du-ma* [an official] (should give) [lost quantity]; *-jo* the *a-to-mo* [unclear denomination] (should give) P 3.

This text probably had a heading, some introductory phrase stating the purpose of the operation, but it is lost, so that we will never know why the palace wanted to assemble these amounts of gold. We are left with a list of persons, designated either through their proper name, through a title or both. The sociological complexity of this group has been shown by CHADWICK (1989/99) in his

PY Jo 438

.0]
.1		]ko-re-te
.2	te-ko[	]AUR M 1
.3	e-re-ta[	]AUR N 1
.4	po-ro-ko-re[-te	]AUR N 2
.5	do-ri-ka-o , mo-ro[-qa	AUR]N 1
.6	ru-ro , mo-ro-qa	AUR [] 1
.7	ne-da-wa-ta	AUR [qs]v.
.8	e-ke-me-de	AUR N[qs]v.
.9	ro-]u-so , ko-re-te	AUR P L 4[]v.
.10	pa-ki-ja-ni-ja[ko-]re-te[	]AUR P 4[]v.
.11	a-pu ₂ -ja , ko-re-te[	]AUR P 5
.12	ka-ra-do-ro , ko-re-te[	]AUR P 5
.13	]vest.[]ko-re-te[	]AUR P 5
.14	]ki[]	AUR N 1
.15	]ma	AUR P 6
.16	wo-no[]ma	AUR N 1
.17	qo-wo[]mo-ro[-qa]	AUR N 1
.18	a-ka-wo	AUR P 3
.19	e-re-e , po-ro-ko-re-te	AUR P 3
.20	a-ke-ro , qa-si-re-u	AUR P 3
.21	te-po-se-u , ti-nwa-si-jo ko-re-te	AUR N 1
.22	po-ki-ro-qo	AUR N 1
.23	au-ke-wa	AUR N 1
.24	ti-mi-ti-ja , ko-re-te	AUR P 6
.25	i-te-re-wa	AUR P 6
.26	pi *82	AUR P 6
.27	e-ra-te-re-wa-o , ko-re-te	AUR P 6
.28	a-ke-re-wa , ko-re-te	AUR P 5[]v.
.29		
lat. sin.	po-so-ri-jo po[-ro-]da-ma AUR P [] × []-jo a-to-mo AUR P 3 ×	

commentary on this important text. Most of the people mentioned here are already known from other texts. It is a mixture of persons belonging to the central palatial elite, like military officers or high functionaries from the political centre, local officials (district heads, the *ko-re-te* and *po-ro-ko-re-te*) and even one *qa-si-re-u*. This last title, the predecessor of historical Greek βασιλεύς, is used in Mycenaean times for a category of notables of local importance, linked to local communities and external to the palatial hierarchy (CARLIER 1984; new discussion and proposals in MÜLLER 2015). The toponyms sometimes linked to these titles are organized in a way that conforms broadly to the division of the kingdom in two provinces, but does not follow the customary order of districts we find in other fiscal texts. This text lacks the systematic character that one would expect from fiscal documents and therefore cannot be considered as “canonical”: it lists some of the 16 districts but not all, some of the *ko-re-te* but not all, only a few military officers, and so on. In the absence of any explicit element in the text, the nature, parameters and goals of this levy remain unclear. CHADWICK (1998/99) made the guess that such a levy in gold, apparently exceptional as it is, could be made to pay for mercenaries, which are attested elsewhere in Pylian texts. There are some ways to link this list to the presence of mercenaries, not least the mention of military officers and the repartition of place-names.

What is certain about this list is its object: everyone has to deliver a given quantity of gold, which must be raw metal, ingots, or scrap material, since it is designated through the ideogram for gold. If this text was about a given item, the scribe would quite certainly have used another ideogram (for a vase, for instance), possibly in ligature or complemented through the ideogram for gold. This text is about the metal itself, not about objects in gold. The quantities are quite diverse.

Leaving aside the incomplete numbers, they are as follows: a particular contribution amounts to M 1 (a double mina, ca. 1 kg); 9 to N 1 (some 250 g) and 1 to N 2 (some 500 g); 5 to P 6, 3 to P 5, 4 to P 3 (with P = ca. 20.8 g; P 3 = ca. 62.4 g; P 5 = ca. 104 g; P 6 = ca. 124.8 g). (I use here the conventional values for the conversion of Mycenaean measures, which are only an approximation: ALBERTI 2003; 2016, 702-706). The document accounts for important quantities: roughly 1 kg (M 1) or 0.5 kg (N 2) of gold are, in fact, no small change. But the values are too diverse to reveal any form of standardisation. The rules along which the level of contribution is calculated for every contributor remain obscure.

A last point to be discussed here is the value of the ideogram. It is Linear B sign *141, usually transcribed as AUR for *aurum*, gold. It has long been assumed that Linear B had ideograms for bronze and gold, but not for silver. A recent re-examination by GODART (2009, 112-114) of a complex list of of-

ferings from Pylos (PY Tn 316) has led him to distinguish two variants of sign *141, which he called *141 and *141bis. He argues convincingly that the two variants are so different, and so clearly distinguished in one and the same text, that they probably have different significations. In this understanding we would have two ideograms – one of for gold, and the other for silver – but the precise attribution of each ideogram would remain open (in that sense FRANCESCHETTI 2012, 257). However, GODART (2012, 114-115) interprets the sign *141bis (the rarest of the two variants) in PY Tn 316 to stand for silver, and *141, the usual form, to stand for gold because the offerings appear to be organised in a hierarchical order, beginning with the more precious gold and continuing with the less valuable silver. I therefore consider it the best hypothesis that *141, the sign used also in PY Jo 438, means gold, not silver.

Back to money: Chadwick, as we saw, suggested that gold could be used to pay mercenaries but did not call it money. The picture which emerges from this text, nevertheless, is that of diverse elite social groups being taxed in an informal way (meaning: a somewhat unusual way, not following the usual rules of the fiscal administration) and constrained to deliver a considerable amount of gold. A minimal evaluation of the total amount of gold expected here, taking into account the missing numerals, may be a little bit more than 5.75 kg. Whatever one thinks of the hypothesis based on mercenaries, the unusual nature of the levy suggests that it is made for some practical use, not for storage in the palace: it would circulate. On the other side, why do these persons have gold at home, unless it is something that one would be interested in storing? It is clearly not a regular item of interest for the palace, and its presence in the hands of some privileged social groups may be revealed in this text precisely because of its exceptionality: for this time, the palace needs gold, perhaps for its mercenaries, when it usually uses goats and wool to pay for alum.

Perhaps it is not without pertinence to add that on the Uluburun shipwreck, only rare pieces of silver came to light, but a collection of ‘scrap gold’ was found (PULAK 1988, 26-28). Is there a possibility that semi-independent merchants of *tamkaru* type would use gold, as did some parts of the Pylian elite (on the *tamkaru*, merchants or palace officers or both, see GRASLIN 2009, 381-438)?

As far as the palatial Late Bronze Age is concerned I would therefore argue, on the basis of some Linear B texts and a still limited archaeological material, that the equivalency systems used by the palace in internal accounting, fiscality, and exchange (see the texts on alum mentioned earlier) was indeed a way to ensure accounting and payments on the administered side of the economy. In the meantime, I would argue that a weighed gold money was circulating among the richer groups of society, such as local notables and also palatial elites

in their private activity, and that this gold money would be well suited to ensure the circulation of payments in the international economy with Egypt and the East.

A last one Linear B text should be mentioned here. Tablet PY Ae 303 registers 14 or more women slaves 'because of the sacred gold'. It is quoted and translated in the yellow box below.

They are usually considered guards of the sanctuary treasure, and the causal relation (*e-ne-ka* 'because of') is taken to indicate the cause of their presence at Pylos. I would take this as the cause of their very status as slaves, and the whole text as a registration of the change in status of debtors after default, meaning that these women may be slaves precisely because they did not pay back their loan from the sanctuary. There would be nothing unusual in seeing a sanctuary functioning as a credit institution (for instance CHARPIN 2005 for Babylonia, CHANKOWSKI 2005 for the Greek world, and all other articles assembled in *Topoi* 12/13, 2005), and the possibility of debt slavery or servitude for defaulting debtors would be coherent with the important numbers of 'slaves of the deity' registered in cadastral texts on land linked to the sanctuary. This reading of the text would shed more light on weighed gold in Mycenaean Pylos. It is not, however, essential to the argument for the existence of a weighed gold money, for which Jo 438 appears sufficient.

It is certainly pertinent to go back to the similarity of economic practices around the Eastern Mediterranean. The reference to Near Eastern realities may have been misleading when Mycenologists were looking for hacksilver, but a closer look leads in a different direction. In the Late Bronze Age, as opposed to earlier and later periods, some evidence does hint at the use of gold as a standard of value and as circulating hackgold. In Egypt, gold seems well represented in the Ramesside hoards from the Cairo Museum (listed in a short article by VARGYAS 2002/10) and as a means of payment and standard of value (GARDINER 1941-1952, II, 61). The clearest case is Babylonia, where in Kassite times gold had replaced silver (as shown by KLEBER 2016). Last but not least, this seems to be the case also in the Southern Levant, under Egyptian control at the time (I thank Tzilla Eshel for pointing this out to me during the Weights and Money workshop; one example of a hackgold hoard is in

GOLANI/GALILI 2015). This would be a perfect period for the loan of the very word for 'gold' by the speakers of Greek from one Semitic language (Akk. *ḫurāṣu*, Ug. *ḫrṣ*, Heb. *ḥārūs*, Phoen. *ḫrṣ* 'gold' > Gr. χρυσός, Myc. *ku-ru-so*), and also for the loan of the word for 'mina', coming as well from the East, in the context of reciprocal knowledge of weighing systems and measures between the Aegean, Egypt and the Levant (ALBERTI 2003).

The Early Iron Age Aegean: Gold maintained?

During the Early Iron Age, gold did probably retain this role. The Eretria hoard, dated to the end of the Geometric period (last quarter of the 8th century BC), is exactly what one would expect of hackgold, if compared with the many hacksilver hoards of the Levant. Its composition, with pieces of raw gold bearing traces of cutting and fragments of pieces of jewellery, is reminiscent of the composition of the gold hoard from the Southern Levant just mentioned (GOLANI/GALILI 2015). This hoard is an essential piece of the story of monetary means in the Aegean (THEMELIS 1983; KROLL 2001; 2011; HEIJMANS in press). A find from a tomb near Knossos, at Khaniale Tekke, should be added here; it has been interpreted as the tomb of a Levantine goldsmith, but this assemblage may well be hackgold: it comprises five gold bars, three gold dumps with an average weight of 18.68 g; a silver dump of 7.25 g, and an electrum dump of 15.53 g. It is dated to Protogeometric B, in Cretan terms the central part of the 9th century BC (HUTCHINSON/BOARDMAN 1954; BOARDMAN 1976; DOMÍNGUEZ MONEDERO 2011).

In the Homeric epics, as is well known, oxen are the most frequently cited standard of value. However, the mentions of goods in storage (*keimelia*) in the aristocrats' treasures typically contain metals, bronze, iron and gold. On the gold talents mentioned in the epics, VAN WEES (2013, 111 with n. 18 for the occurrences) has recently offered a synthetic view. These mentions are difficult to interpret: they are probably not talents of 26-30 kg but much lighter than that (a daric after HERON, *Geometrica* 23.58), perhaps small circular plates, of the type found in the much earlier Grave Circle A at Mycenae, as proposed by NICOLET-PIERRE (2006). They are used at least as storage of value. In any case, whatever their material forms, small pieces of gold seem to circulate in the Homeric epics. As with Linear B, it may be supposed that a general reference to gold as a metal indicates that it has the form of ingots or small unworried pieces, since a more elaborate form would have deserved a mention. The problem with gold in Homer is the exact function it may assume. Even if one thinks that the predominance of oxen as standard of value may be due to the aristocratic perspective of the poems, the fact is that talents of gold go along with other gifts and do not have any particular status. There is no trace of gold being used as means of payment. On

PY Ae 303

.a i-je-ro-jo
 pu-ro, i-je-re-ja, do-e-ra, e-ne-ka, ku-ru-so-jo MUL 14[
 .a i-je-ro-jo on [[e-ne-ka ku-ru-so-jo i-je-ro-jo]]
 'At Pylos. Slaves of the priestess, because of the sacred gold: 14+ women.'

the contrary, in a well-known scene of the *Iliad*, the Achaeans give bronze, iron, skins, oxen and slaves in exchange for Lemnian wine (HOMER, *Iliad* VII 473-475). So, the main question here the exact function of gold: storage? Exchange? Measure? (Again, to classify it as 'pre-money' is not enough and does not give an answer). The ways in which we frame the role of gold among many other means of payment and evaluation in the Bronze Age affect the ways in which we understand the appearance of silver in the following period.

Silver in Archaic Greece

The hypothesis that the Early Archaic world of the 7th and early 6th centuries BC saw the expansion of weighed silver as money from the Near East towards most of the Eastern Mediterranean, including the Aegean, has been based on essentially three elements: (1) the presence of evaluations in silver in what is left of Solon's laws (KROLL 1998); (2) the fragment of an accounting text from the Ephesian Artemision, *I.Ephesos* 1 (see below); and (3) the presence of hacksilver in some hoards of the late 6th or early 5th century. The idea that silver bullion was in current use as money from c. 650 BC onwards in the Aegean has met criticisms and scepticism (summarised in ZURBACH 2018a, 3; see the intermediate position expressed by FISCHER-BOSSERT 2018, 17). However, a review of the evidence shows that it is highly probable. On Solon's fragments, the main criticism has been expressed by DAVIS (2012), but it has to be noted that Davis agrees with the existence of weighed silver money in the 6th century BC, and with the use of barley as a concurrent means of evaluation. The main differences between the approaches by Kroll and Davis lie in the chronology (somewhat later for Davis) and in the use of silver, which was, according to Davis,

essentially used in external exchanges outside the city. On the second point, the text from Ephesos, dated to the late 7th or early 6th century BC, allows definitive conclusions on the use of weighed gold and silver in the accounting of an Archaic sanctuary. KROLL (2020) has recently given a new edition and thorough commentary of this text, which I will quote here using his new translation (yellow box below).

It is clear here that we are dealing with a common procedure of weighing non-coined silver and gold. The context is fiscal and deals not only with taxes on commerce, which might implicate that the use of weighed precious metals did go beyond 'international' trade. Here we find both gold and silver, which is unusual and probably correlated to the relatively high date of the text and a regional tendency to use both metals in Asia minor, on which we will have to come back.

The presence of hacksilver in some hoards is certain, but they are all relatively late (after the mid-6th century BC). The absence of hoards of hacksilver analogous to those we know from the Levant is certainly the main problem with the theory that it became widely used in the Aegean early in the Archaic period. However, there is an immense bias in data recovery. Since non-minted silver has become only very recently a topic of interest in Classical archaeology, it is highly likely that older discoveries of hacksilver hoards may have received scarce attention. Not to mention the possibility of illegal looting. It is remarkable that hacksilver survives in hoards where it is mixed with coins, and these hoards are Late Archaic in date (see below on the Colophon and Taranto hoards, ca. 530 and ca. 500 BC respectively), but this does not mean that hacksilver did not pre-date coinage.

I.Ephesos 1

Face A

Forty-[nine] minas of the first (gold) were weighed, gold from the gi[fts]; they were brought from the city. Twenty-five silver minas were brought in (i.e. with) the first gold. From the spear (i.e. martial revenue) six minas of g[old] were weighed. Ten minas of gold from here were weighed. Thirty-three minas of silver were weighed here, silver f[rom the] marit[ime] (revenue). [From th]is [there re]sult[ed] seventy minas of pur[e gold].
[- - - - -] ten from the salt (revenue) [- -] T[- - - - -]

Face B

[- - - - - in] ad[dition] to the half-min[a, from the s]pea[r (revenue) - - - - -] of [gol]d twenty minas lacking a half-mina. [Thi]rty minas were weig[hed] [? number of] staters and a sixth from the salt (revenue). [-? -? -? -? -? -?]. Of thi[s gol]d we obtained fourteen minas. There resulted from this a hundred(?) min[as and a sixt]h; a half-mina and five twelfths of the phiale. From what we made (i.e. earned or worked), forty minas and eighteen stat[ers were weighed.] [From the ga]rden thirty minas of silver were brought [- - - - -] and five

It is not totally correct to say that there is no material evidence for weighed metal before the mid-6th century BC. The new study of the Artemision hoard by KERSCHNER/KONUK (2020) has led to the publication of small lumps of electrum which were deposited with the earliest coins. Additionally, a poorly recorded hoard, probably from late 7th century Berezan, the ancient Borysthenes, at the mouth of the Bug river on the Northern Black Sea, comprised lumps of electron and small pieces of gold jewellery together with early electrum Ionian coins (KARISHKOVSKIJ/LAPIN 1979; not to be mixed with the hoard discovered in 2000, which is at least in part a forgery; KIM 2004). The use of non-coined gold and electrum seems then to be possible in the second half of the 7th century, at least in Ionian contexts. This shows that there is still a lot of work to be done along this line of research, and that *ex nihilo* arguments are not satisfactory.

The problem of the uses of silver in different spheres (in long-distance trade, to pay taxes or as loans, *etc.*) raised by Davis had already been discussed by KROLL (1998, 226) and DESCAT (2006b). Kroll already makes the hypothesis that silver has something to do with the debt crisis among the peasantry which led to a deep social crisis in Athens before Solon. Descat has shown that it is most probably a sign of the opening of different spheres of monetary use which were separated until then. To say it in a somewhat direct manner, the transformation of traditional ways of exploitation of the peasants as *hectemoroi* (share-croppers) into slaves might have been facilitated by a new kind of debt. Hesiod, writing c. 650 BC, speaks of a debt made of loans in kind between neighbours in a village community, without any way for the creditor to seize anything in case the debtor should default. The only punishment is that the one who will not pay back his debts will not find anyone to lend him again some barley – these debts are in kind, typical for a peasant society where one needs some food before the harvest. The debt which characterises the pre-solonian crisis is completely different. It is an unequal relationship between a peasant and a landlord; the typical case mentioned by PSEUDO-ARISTOTLE (*Constitution of the Athenians* II 2) is the *hectemoros* peasant who cannot pay his rents to the landlord, and whose unpaid rents are assimilated to a debt. How has this debt become something so compelling that it might lead the *hectemoros* from unpaid rents to unpaid debts to debt slavery? The answer is most probably that the debt is now expressed in silver, which is much harder to find than barley (see ZURBACH 2013; 2017, 350-357). This would typically be a situation of incomplete monetisation, when landlords used silver in trade and imposed it onto peasants without much access to silver. Davis is surely right in arguing that barley was the main standard at this level, but this does not in my view disqualify Kroll's and Descat's arguments (DAVIS 2012, 154 n. 153, with criticisms to these arguments).

Money functions here as a means of control of the workforce, or even of creating a workforce. Somewhat later, probably in the course of the 6th century BC, as THEOPOMPOS (FGrHist 115 fr. 122) tells in a famous passage, people from Chios were the first to possess slaves brought from outside, and called them *argyrônētoi*, 'bought with silver' (DESCAT 2006b). An instrumental role of weighed silver in the creation and control, through debt, of a workforce of servile or dependent status is to be found also in the three biblical Codes, the dates of which fall in the first half of the 1st millennium BC (LEMAIRE 2015). This is also known for weighed bronze, in Archaic Rome from the reign of Servius onwards (LEROUXEL 2015). In that sense, in explaining the rapid spread of silver coinage through the world of Greek city-states in the second half of the 6th century, it is legitimate to underline that these coinages most probably constitute a follow-up on an already ancient uses of hacksilver, and that both kinds of silver, coined or not, are instrumental in the organisation of Mediterranean slave societies.

There are even closer links between hacksilver and silver coinage. As a matter of fact, they do co-exist in some hoards of the late 6th century. The Taranto 1911 hoard (IGCH 1874) of ca. 500 BC contains some 10 kg of silver, two thirds in ingots and smaller parts of silver; the rest is some 500 coins from Southern Italy, and some 100 from Sicily and the Aegean (KROLL 2008). The most interesting case, however, is the Colophon hoard of c. 530 BC (IGCH I 3; KIM/KROLL 2008). It contains 906 coins, among which 353 twenty-fourths of the Lydio-Persic stater of 10.7 g, that is, coins of 0.43 g; and 552 forty-eighths of the same unit, that is, coins of 0.21 g. The 77 pieces of unminted silver weigh 318 g and are much heavier than the coins. A careful die study has shown that this is only a small part of a huge quantity of coins minted in a short time, perhaps hundreds of thousands in one or two decades. Coinage is used here to facilitate the use of the smallest pieces (KIM/KROLL 2008, 67). It is one structural problem of hacksilver: at some point, after many divisions and cutting-offs, one can no longer test or even weigh efficiently the smallest pieces. At this level, the adoption of coinage may be defined as a transaction cost problem, since the economic agents would have had difficulty in using hacksilver in transactions involving very small amounts. It is the city-state which chooses to suppress this problem by issuing coins. Perhaps, then, in contrast to many things having been written on the origins of coinage, HERODOTUS (*Histories* I. 94) was not so false in attributing the invention to the Lydians because they were *kapeloi*, that is, retail-sellers, the people you find on the agora, which was organised around that time (DESCAT 2006a). Coinage appears in a context where economies are already monetised.

3. Opening questions

This leads to three questions which deserve, if not an answer, at least a careful formulation.

1. The history of silver in the 7th-6th centuries, despite the poor evidence, shows that the shift from one metal to another, particularly from gold to silver, cannot be seen in isolation from the whole system of equivalencies. How can we correlate the changes in function of money to the nature of metal used? Silver may for instance have transformed the relation of debt, replacing the debt known to Hesiod, payable in kind to a neighbour, into a debt opening on debt-slavery. Silver here replaces grain as a means of payment; there seems to always exist a cereal standard: emmer wheat in Egypt (GARDINER 1941-1952, II, 59); barley in Greece (PLUTARCH, *Solon* 23.3, and *supra*). The question, then, remains: how are we to relate changes in the material aspects of money with changes in function, or changes in the relations between different spheres of money use, from trade to debt for instance?
2. There are two material correlates to weighed metal money: hoards of small to medium fragments of metal without any standardisation, and series of standardised objects like the double-axes (*pelekeis*) of some Archaic inscriptions (but did they ever exist as objects?) or the iron spits (KOSTOGLOU 2003). Strictly speaking, the practice of using a weighed money does not lead to series of standardised objects, but to groups of small pieces of various sizes. The relation, and the tension one might suppose, between weighing and standardising is still unclear. Standardisation may even lead to some kind of nominal value.
3. How are we to understand regional differences? 6th-century Tyrrhenian Italy was using bronze weighed money. The Giglio wreck, an Eastern Greek merchant ship which sank around 600 BC off the small island in Etruria, carried a number of small pieces of bronze, not silver. This means that the crew adapted to the local currency (CRISTOFANI 1992/93). Was there a means for a merchant to exchange silver for bronze? Were there professional money-changers? Usually the appearance of money-changers, at the origin of the Greek bank (BOGAERT 1968), is linked to the existence of *polis* or *ethnos* coinage. As a matter of fact, when each city-state mints its own coins, it becomes mandatory to have a system of money-changing, and to be able to come with coins from abroad and change them on the spot for the local coins. In that perspective, given that the world of non-coined metal money functions with different metals all over the Mediterranean, it may be asked if some form of money-changing was already available, notably in the *emporía* which were the nodes of Archaic trade.

Some conclusions

1. In the Near East and Egypt, legal, documentary, and material evidence shows that, since the 3rd millennium BC onwards, by using weighed silver or gold, or in some cases copper, one could pay a tax or a tribute, receive a salary, buy movable goods, animals, slaves, or even land, or do a 'gift' and receive some land as a counter-gift. These bits of metal could be stored, given as a loan, and then upon the debtor's default, cause them to fall into slavery. Non-coined metal functions as a measure of value, a storage of value, and a means of payment. Any definition of money which would remove this from the history of money would be wrong. This is money.
2. This kind of money has its own history, which is only beginning to be written. This is a reminder for Hellenists who too often still see the 'Near East and Egypt', from Sardis to the Indus, as something homogeneous or at least with sufficient coherence to be opposed *en bloc* to the Greek world. The work on monetisation in Assyria and Babylonia mentioned at the beginning of this article shows quite the contrary, as does the study of the Levantine hoards. There are changes in the metal used, concurrent use of different metals, variations in the quantities and qualities of circulating metal(s), and variations in the forms of objects. These are no less interesting than the same questions asked about coinage, like the generalisation of silver coins from 550 BC onwards, or the introduction of bronze coinages in different parts of the ancient world. There could even be links between both sets of questions, in that the early Siceliot bronze coinage could take over a local indigenous tendency to use bronze as weighed money (LAZZARINI 2009; CACCA-MO CALTABIANO 2011), or the gold coinages of Asia minor could be the successors to the continued use of weighed gold in that region. The simultaneous use of different metals has to be examined at different levels: as parts of the same monetary system, as in the Ephesos inscription, but also as traces of different regional monetary and economic spheres – see *supra* on the Giglio wreck (ZURBACH 2018b). A quite difficult question, the last I will mention here, is the ultimate explanation for shifting from one metal to another: how are we to understand the consequences of the expansion of silver in Archaic times, and its link to the debt crisis? Was economic change permitted by the new metal and if yes, in what ways?
3. It is important to note that weighed money goes along with many forms of credit. The use of money may have made credit even more convenient by delaying the payment of goods in those instances in which small change was not available. For example, one could imagine that

it was not always easy to pay beer in silver, since the amount of silver required would have been so small that it would have been difficult to weigh out. We know that one consequence of coinage has been the creation of money-changers. One may travel very far with hacksilver, but when payments are to be made with local coins it becomes necessary to have the possibility to change money. This is the origin of the bank in the Greek world. Contrary to a widespread belief, however, it is not the origin of credit (LEROUXEL 2015). The complexity of the credit economy of Mesopotamia has long been recognized. In Greece the transformation of credit is at the very heart of the Archaic crisis. The link between weighed money and credit is essential since it opens questions of strict monetary but also economic importance, like the money supply (the total quantity of money available at a time), since credit creates money.

4. It is therefore an urgent requirement to add this chapter to monetary history. Going back to Keynes: the turning points in monetary history may be recognised as the introduction of metal money. Metallurgy itself did introduce a new kind of movable wealth, and this was much more of a change, and much earlier, than coinage. A consequence is that historians, particularly Hellenists, should avoid considering weighed money as a preface for coinage, something of a 'not-yet-money', a predecessor without much importance, which would be naturally replaced by coinage when it would, at last, have been invented.
5. Taking into account the monetary systems based on weighed money leads to a more diverse economic history. We should abandon inherited partitions and separations 'Greece' and 'The Orient' ('gift' and 'money'). Perhaps most important is the question of frontiers. There is place for a history at the level of the Archaic Mediterranean, notably, when monetisation through hacksilver (gold on some occasions, bronze in Tyrrhenian Italy) led to profound social transformations, censitary political systems, credit with interest and debt-slavery. This is a reminder that money and credit can be formidable tools and multipliers, especially today when economic history has been almost completely reduced to a search for growth (LEROUXEL/ZURBACH 2020). There are also darker sides to money, which played a fundamental role in creating the slave societies of Antiquity.

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Abbreviations

- CH *Coin Hoards*. Royal Numismatic Society (London 1975-).
- IGCH *Inventory of Greek Coin Hoards*, edited by M. Thompson, O. Mørkholm, C. Kraay (New York 1973).

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Money in the Old Assyrian period

by JAN GERRIT DERCKSEN

Assur, Kültepe, Kanesh, Old Assyrian, trade, money

The legacy left by the Old Assyrian trading practices is comprised of a rich body of written and material evidence which offers a unique insight into the use of money, both by the Assyrian traders and their families in Assur and Kanesh, and by the inhabitants of Kanesh and other Anatolian towns. The present contribution describes the goods used as money and the functions this money fulfilled, the shapes and qualifications of metals used as money and the regional and chronological dimensions involved. It also addresses some metallurgical and archaeological issues.

Geld in der altassyrischen Zeit

Assur, Kültepe, Kanesh, altassyrisch, Handel, Geld

Das Vermächtnis der altassyrischen Handelsaktivitäten anhand von Keilschrifttexten bietet ein reiches Zeugnis, das einen einzigartigen Einblick in die Verwendung von Geld gewährt. Dieses wurde sowohl durch die assyrischen Händler und ihre Familien in Assur und Kanesh als auch durch die Bewohner von Kanesh und anderen anatolischen Städten genutzt. Der vorliegende Beitrag beschreibt die Güter, die als Geld dienten, und die Funktionen, die dieses Geld erfüllte, die Formen und Eigenschaften der als Geld verwendeten Metalle sowie die damit verbundenen regionalen und zeitlichen Unterschiede. Dabei wird auch auf einige metallurgische und archäologische Fragen eingegangen.

1 Introduction

1.1 The Old Assyrian period

Evidence concerning goods used in monetary functions in the Old Assyrian trade stems in the majority of cases from the site of Kültepe (ancient Kanesh) near the Turkish city of Kayseri. At that time, the beginning of the Middle Bronze Age, the political landscape in Mesopotamia and Anatolia consisted of well-organised city-states governed by a king, some of which expanded into larger territorial states. Excavations in the Lower Town of Kültepe led to the discovery of about 23,000 texts (clay tablets, envelopes, bullae) inscribed in cuneiform in the Akkadian language; however, most of the texts dated by eponym stem from a period of about 30 years (Revised Eponym List no. 80-110, c. 1893-1863 BC, see BARJAMOVIC *et al.* 2012; for Assyrian archives, see VEENHOF 2003). They originated from the activities of merchants from the city of Assur in North Iraq, who travelled to Kanesh during the 1st century of the 2nd millennium BC and many of whom eventually settled there and in other towns in Central Anatolia (estimated at 700-800 persons during REL 80-110). Two main periods of Assyrian activity in Kanesh can be distinguished, named after the stratigraphy of the Lower Town: the Level II period (c. 1925-1835 BC), which is regarded as the classical period of trade, and Level Ib (until c. 1710 BC). Assyrian cuneiform texts have been found at both levels. The most recent level (Ia) did not yield any such texts and represents the time shortly before the Old Hittite period.

The trade consisted of the bulk import of tin and textiles and smaller quantities of other elite goods from Assur to Kanesh, which were sold for silver and gold (sometimes also using copper and wool) in that town or elsewhere in Central Anatolia. The Assyrians established trade colonies (Akkadian word: *kārum*; colony in the sense of a group of merchants settled in a foreign land retaining contact with their city of origin) and smaller stations (Akkadian: *wabartum*) in Kanesh and at other towns of economic importance (see Fig. 1 in the article by G. BARJAMOVIC in this volume), which were administered by the merchants under the auspices of the city-state of Assur. Their activities were enabled and protected by treaties which Assur or the Kanesh colony concluded with local rulers.

At the same time, the documentation informs us about Anatolian society, partly through texts written on behalf of the palace and some members of the Kaneshite elite.¹

1.2 Scholarship concerning the existence and use of money in Ancient Mesopotamia

Before reviewing the Old Assyrian material for money, I will briefly summarise the main opinions in Assyriology about money during the Old Assyrian and Old Babylonian periods.

The definitions of the uses of money in this article follow those by Karl POLANYI (1957, 264-265), without, however, accepting his tenets about the absence of markets or market forces. Money is used as a means of (deferred) payment, as a standard of value, and as a means of (indirect) exchange. Payment is the “discharge of obligations in which quantifiable objects change hands” and the quantifiable object is accepted as payment in at least two different types of obligation (*e. g.* dues, taxes, rent, or tribute). If the payment is due in future, as with debts, the term deferred payment is used. As a standard of value, amounts of different kinds of goods are equated for definite purposes. (Indirect) exchange involves the use of quantifiable objects to directly or indirectly obtain other goods.

In his study of money in the Old Babylonian period (roughly 2000-1600 BC in South Iraq), SWEET (1958) presents abundant evidence for the use of various commodities as money. He employs the word money in the definition of Polanyi. Sweet notes that the most important use of silver as money during this period was as a standard of value, introduced by the logogram *kù-bi* “its silver” or “commodity *ša* x silver”. He remarks that the use of silver as a standard of value “was much more common in business documents than is immediately obvious” and argues that “many of the references to silver as a means of payment were really no more than payments in other forms (in kind) which were disguised as payments in silver for reasons of scribal convenience and simplicity” (SWEET 1958, 128). This statement is of great significance for the understanding of the economy. Sweet bases this conviction on a small number of texts which specify what was used as a means of payment instead of silver. Yet, he acknowledges that in other cases there is concrete evidence for the physical use of silver.

Other commodities that served as a standard of value, albeit on a much smaller scale than silver, were cattle and barley. As a means of payment, barley was frequently used in Babylonia, much more than silver. The use of actual silver seems incontestable in texts where it occurs alongside other commodities used as a means of payment. Sweet notes that the quantities of silver used are always small and rarely exceed ten shekels and that the type of transaction can be regarded as minor. Large transactions were paid in kind (barley, sesame oil).

A commodity functions as a means of (indirect) exchange when it is obtained by direct exchange for other goods or services and is subsequently used as payment to obtain yet other goods or services. Silver was preferred for long-distance transactions, but otherwise it did not function as the preferred

1 A good introduction to this period can be found in LARSEN 2015. VEENHOF 2008a contains a thorough discussion of all aspects of Old Assyrian history and trade. From c. 1972 BC, the chronology rests on the succession of year-eponyms in Assur; the relative number is preceded by REL according to BARJAMOVIC *et al.* 2012, 92-97.

means of exchange. Sweet concludes that there was no actual money or moneys of exchange during the Old Babylonian period.

The existence of money is not questioned by LEEMANS (1960) or in the writings of POWELL (1996; 1999), who argues in support of the important role of money in the Mesopotamian economy, with silver as the main currency. He investigated the role of weight stones in the physical exchange of metal as money. As for silver, POWELL (1999, 16) stated that he “cannot imagine silver circulating from hand to hand on a daily basis throughout the whole populace – including rural areas – in the Old Babylonian period or in any later period”. Still, silver played an important role in the economy.

RENGER (1995; 2007) stressed the importance of considering the embedded position of the economy of Mesopotamia in its society, a crucial point in Polanyi’s theoretical framework. In his analysis, the form of economic organisation determines the room there is for market exchange and the use of money apart from receiving rations and sustaining agriculture at a subsistence level. The economic sphere therefore determines the use of money, and Renger argues that silver played a small role in the economic exchange between and within household organisations (*oikos*). He considers the silver brought to Assur by Old Assyrian merchants as merchandise (*Handelsgut*) and, although this trade is a fine example of an embedded economy, the profit-driven attitude of its merchants makes it in his opinion an exception within Mesopotamian economic history.

The relation between money and trust is at the heart of the book edited by VAN DER SPEK/VAN LEEUWEN (2018). It discusses the role of money from its emergence in 3rd millennium BC Mesopotamia until the present. The Old Assyrian evidence is summarised there as well (DERCKSEN 2018).²

1.3 Weighing metal: Evidence and practical problems

The goods that functioned as money were weighed (*šaḡālum*) in the case of metals or measured out in volume (*madādum*) for cereals. The Old Assyrian texts contain at times small amounts of silver, and the question is whether the weighing system allowed precise weighing of such quantities, or whether the small amounts result from calculation, and serve, in the case of silver, to indicate the silver value. It is likely that there was a difference between the accuracy of palace weighing systems and those outside the palace, with a special position for merchants.³ But even within the sets of balance

weights handled by an institution there may have been slight differences. A span of variation exists among balance weights of 3 to 5 % (POWELL 1989-1990, 509-510; IALONGO *et al.* 2018). Powell wrote: “Based on calculation of standard deviation in Old Babylonian precision weights, I postulated (POWELL 1979, 82-83) that the margin of error in small weights was about three per cent of the total mass. At the mass of a shekel, this would amount to about a day’s pay in silver, so it is obvious that exchange of cheap commodities or small amounts of commodities for silver is not something to be expected.” (POWELL 1999, 16). The interpretation of balance weights is further complicated by the fact that there co-existed several standards with a basic unit of one shekel. Among the stones excavated in the south Babylonian city of Ur and dating to the Ur III/Old Babylonian period, are some that belong to a non-Mesopotamian unit (PEYRONEL 2019, 71).

A detailed description of balance weights excavated at Kültepe is now available (KULAKOĞLU 2017, tab. 21.3); the smallest stone possibly representing a fraction of the Mesopotamian shekel is one of 10 še (from Level Ia), followed by stones of 30, 45, 90, 120, and 135 še (one shekel consisting of 180 še). The one-shekel stones range from 8.00 to 8.95 g and weigh on average 8.296 g. It was already clear from earlier publications that the majority of these stones belong to the Mesopotamian system with a shekel being about 8.3 g; a smaller number of stone weights represent the Syrian and Levantine systems, and some stones can be assigned to the local, Anatolian system (with a shekel of about 11 g), which the Assyrian merchants called the “stone of the land” (*aban mātim*) (DERCKSEN 2016; PEYRONEL 2017, 206-207). This Anatolian system was in use by the palaces in Kanesh and other towns in Central Anatolia (the *aban ekallim* “stone of the palace” of Durḫumit occurs in AKT 6A, 251:11-12), but details are lacking to establish whether these differed from the one used in Kanesh.⁴

The Assyrian standard balance weights were kept in an institutional environment: the City Hall in Assur and the Office of the Colony in Kanesh.

1.4 Goods functioning as money and their prices in silver

The goods used as money during the Old Assyrian period were metals (copper, tin, silver, gold) and barley. The Assyrian merchants were not involved

is evidence that amounts of silver could be weighed at the Office of the Colony (DERCKSEN 1996, 86; not “deviations of weights”). According to KULAKOĞLU (2017, 349-350, 353), six scale pans were found in Level II, and four in Levels Ib-Ia, all in tombs, against about 200 weight stones. The problem of possessing such equipment was less urgent when measuring out grain, as creditors usually owned their own measuring pot (*karpatum*) which they used in the process.

⁴ Identified by a toponym are those of Karaḥna (AKT 11A, 97:4), Puruḫattum (Sadberk Hanım 16:4-5), Tuḫpiya (Kt 93/k 278:3-4), Uḫša (Kt n/k 827:7.10).

² The important results in JURSA 2010 will not be discussed here since they deal with money in Babylonia in the 1st millennium BC.

³ It is known that most(?) merchants possessed their own set of balance weights, but it is unclear whether they also owned a balance or always went to a central point in a town where such facilities could be used; in the case of Kanesh mention of the use of the colony’s one-mina balance weight

in the mining or production of any of these commodities. A recent study into the volume of the trade in metals and its geographic distribution can be found in EROL 2019.

Gold (Akkadian: *hurāsum*, logographic writing: kù-gi, kù-ki; DERCKSEN 2005, 25-27) occurs in several varieties defined by colour, shape or origin: *pašallum* (*damqum*) “(good) *pašallum* gold”, *pašallum ša harrān āli* “*pašallum* gold of the road to Assur”, *sāmum* “red”, *pušium* “white”, *kuburšinnum*, *ša abnišu*, *ša tiamtim*, *ša māšū*.⁵ Gold prices in Anatolia range from 10 to 5 shekels of silver per shekel of gold, those in Assur range from 10 to 4 (for details see DERCKSEN 2014, 90-91).⁶ One of the shapes in which gold circulated was as beads (*hiddum*), another one was in the form of bracelets (see 2.1.2 below).

Silver (Akkadian: *kaspum*, logographic writing: kù-babbar), occurs in the qualifications *šarrupum* “refined”, *ammurum* “checked”, *tirum* “coil(?)”, *litum* “?”, *saḥar-ba* “?”, *massuḥum*. The standard quality of silver when used as a measure of value in Kanesh and in Assur is *šarrupum*, which is often translated “refined”. *Litum*, often in the plural *li-tē* (conventional reading) and frequently qualified as “good”, is distinguished from *šarrupum* and *dammumum* in OIP 27, 59. It only occurs in texts from the Level II period and mostly (but not exclusively) with Anatolian debtors. The largest quantities mentioned are 11 minas of good *litus* (ATHE 2A:1; debtor: Ḫaršunuman priest of the sun-god) and 25 minas of good *litus* (TC 3, 231A:1-2; debtors two Anatolians), in both texts with Pušu-ken as creditor. GARELLI (1963, 267) assumed that what he normalised as *liti* and *tiri* denote inferior qualities of silver, but proof for this is lacking. The designation *litum* appears to denote a specific shape of silver typically used in Anatolia, which is suggested by KTK 96: (1) 1 ma-na kù-babbar *li-tē* (2) sig, *ša kà-ni-iš*, “1 mina of silver (in the shape of) good *litus* of Kanesh”.⁸ It was not among the silver transported to Assur; an isolated reference in a debt-note stipulates payment of 5 shekels of good silver *litus* in Kanesh or in Talḫat in Northern Syria (Kt j/k 90) (cf. a loan of *litum* silver to a merchant from Talḫat in BIN 6, 237).

The meaning of the word *tirum* (usually in the plural, *tī-re(-e)*; DERCKSEN 2005, 22; VEENHOF 2014, 397) is unclear. KOUWENBERG (2019) suggested that it means a coil of silver. It is used by Assyrians and Anatolians and the largest quantity mentioned thus far is 16 minas.⁹ VEENHOF (1989, 523) drew attention to the Middle Assyrian use of quantities of tin or silver that are qualified as *tī-re* na₄ é *a-lim* (lit. “*tirus* of/by the balance weight of the City Hall”) and connected it with how the weight was established by the use of official balance weights;¹⁰ previously, SAPORETTI (1981, 29, 32) had translated these phrases “stagno/argento misurato secondo (il peso del) la pietra della casa della città”. Attractive as the interpretation as coils is, it seems difficult to reconcile with tin in the Middle Assyrian expression.

The logogram *saḥar-ba* (lit. “in its earth”; DERCKSEN 2005, 22; VEENHOF 2010, 137; 2014, 396) as a qualification of silver occurs in nine texts from the Level II period and in two from Level Ib.¹¹ Twice, the text on a tablet has *saḥar-ba* but that on the envelope *šarrupam* – whether this is a scribal mistake or whether the two terms could be used synonymously remains unclear.¹² *Saḥar-ba* silver is used to indicate the price of a slave and the extent of debts; it could also be sent to Assur (AKT 9A, 63:3; 50 shekels). Its relative value seems practically the same as that of *šarrupum*; the price of tin expressed in *saḥar-ba* is 5 ⅔ (AKT 5, 41), which is very close to the common price of 6.

Another qualification is *ammurum* “checked” (STURM 1995; DERCKSEN 2005, 21; VEENHOF 2014, 394-395). It is distinguished from *šarrupum* and *dammumum* “good” silver (in an unpublished text *ammurum dammumum* “good checked (silver)” occurs) but this does not seem to affect its value and texts associated with Anatolia demonstrate that its quality did not differ from *šarrupum*,¹³

5 Bronze Age metallurgists were able to remove impurities from gold by cupellation, but were unable to separate silver from gold (cementation), see PERNICKA/WUNDERLICH 2017, 434.

6 Prices for gold types in Anatolia: very good *pašallum*: 10 (AKT 6A, 166:9; ICK 1, 30; OrNS 50, 3:11); 8 ¼ (Sadberk Hanım 12:40); 8 (AKT 2, 9). *Pašallum*: 9 (AKT 9A, 44:12; AKT 11A, 76:19). Good *ša dāmē*: 9 or 8 ½ (Kt c/k 48:37). *Ša abnišu*: 8 (WAG 48-1463:9), 5 ½ (AKT 2, 27). *Ša tiamtim*: 6 (WAG 48-1463:6). *Kuburšinnum*: 5 ½ (AKT 2, 27). Prices in Assur range from 10 to 4 (in Kt 92/k 347:7, see n. 73). Good gold (kù-gi sig) is 8 ⅔ (CCT 3, 22a:11). *Kuburšinnum*: 6 ⅔ (TC 3, 43:9).

7 DERCKSEN 2005, 21-22; VEENHOF 2014, 396. For the singular, see kù-babbar *li-tām dam-qām* in AKT 8, 302:5 and for the plural, kù-babbar *li-tē-e dam-qū-tim* in Kt 87/k 120:7.

8 The same form of silver may be meant by kù-babbar *ša kà-ni-iš* “Kanesh silver” in AKT 10, 27 (= Kt d/k 15) A:1-2 and 27B:8-9.

9 WAG 48-1462: (3) ... 8 ma-na kù-babbar (4) *tī-re a-dī-na-kum* (5) 8 ma-na kù-babbar *tī-re* (6) *ku-nu-ki-a sà-ba-ar-li* (7) *ù a-zu na-āš-ù-ni-kum* (8) šunigin 16 ma-na *i-li-kà-kum* “I gave you 8 minas of silver *tirus*. Saharli and Azu brought you 8 minas of silver *tirus* under my seal. In all 16 minas went to you.”

10 Cf. POSTGATE 2013, 32 n. 94, where the word is read *tiri* and translated “stamped?”.

11 AKT 5, 37:6 (10 shekels); AKT 5, 41:2 (19 shekels); AKT 5, 45:22' (3 ½ shekels); AKT 5, 46:1 (1 ⅓ minas) // AKT 5, 35:6-9 “kù-babbar”; AKT 9A, 63:3 (50 shekels); AKT 9A, 95:22 (4 minas); Lester Guttman tablet:2 (6 minas); TC 3, 246 tablet. Level Ib: Kt k/k 15a (21 shekels); Kt n/k 19 (5 shekels).

12 CTMMA 1, 87a (handcopy): (12) ½ ma-na kù-babbar *saḥar-ba* // 87b: (11) ½ ma-na kù-babbar *ša-r[u-pá-a]m*; TC 3, 246A tablet: (1) 15 gín kù-babbar *saḥar-ba*, but the envelope (246B) has: (4) ... 15 g[ín kù-babbar] (5) *ša-ru-pá-am*.

13 RA 59, 32: 10 ma-na kù-babbar *a-mu-ra-am ša é ma-bi-ri-im galkilia ana nazi iddinma u na-zi* 10 ma-na kù-babbar *uraddi-ma* šunigin 20 ma-na kù-babbar *ša-ru-pá-am* “Galkilia gave 10 minas of *ammurum* silver of the House of the market to Nazi and Nazi added 10 minas of silver, making in all 20 minas of *šarrupum* silver”.

which leaves the shape of the ingot or a certification of its weight or purity as a possible characteristic. *Ammurum* silver was among the silver sent to Assur. A group of traders from the Syrian town of Ebla bought copper at an Anatolian palace in exchange for *ammurum* silver (ATHE 32).

A complaint about the size of the ingots of silver in a grammatically difficult context is uttered in a letter to Pušu-ken, but it is uncertain whether that specifically refers to *ammurum* silver or rather to the bulk of the shipment consisting of *šarrupum* silver.¹⁴

The “checking” of silver may result in the establishment of the correct weight of an amount of silver, which is then indicated. The text mentioned in note 13 speaks of *ammurum* silver “of the House of the market”, an Anatolian controlling institution. It is uncertain whether this can be compared to Old Babylonian “sealed silver” (*kasum kankum*, for which see MARTI/CHAMBON 2019, 59 with n. 42). In other contexts, Old Assyrian uses the form *uddu* “marked, verified” (from the verb *wad-du’u*) in phrases relative to the weighing of silver; if the silver is qualified, *litum* and *šarrupum* occur, but not *ammurum* (see VEENHOF 1972, 58-64). It is never stated who marked or verified the silver, but it is possible that this was done on behalf of the local Office of the Colony.

Scrap silver of good quality is mentioned only once,¹⁵ where it is sent to Assur as a votive offering for the goddess Ištar. Hoards of hacksilver from Acemhöyük and Ebla show that the silver often was in the shape of complete or broken ingots, and rarely consisted of fragments of jewellery or vessels. It is likely that the weight of pieces of scrap was not accidental, but was a form of weight-based currency (IALONGO *et al.* 2018). Other forms in which silver circulated were rings/coils (*šawirum*), beads (*hiddum*), bracelets (*annaqum*); less frequently, toggle-pins (*tudittum*) and cups (*kāsum*) occur. A unique reference to cutting off silver from a torque (*hullum*) is found in AKT 9A, 11:14-17¹⁶.

Silver and gold could be wrapped in packets (*nēpišum*) and bundles (*riksu*) for storage and for shipment to Assur. A packet contained between 10 and 20 minas (about 5-10 kg) of silver, whereas a bundle contained metal from 1 shekel (8.3 g) to 1 mina (about 500 g); exceptional is a bundle of 2 minas (KTS 2, 7:20). Sealed clay tags identifying

the senders and the addressees were attached to the packets and bundles.¹⁷

Silver of poor quality was called *massuḫum* (VEENHOF 2014, 404-405). The levels of impurity must have differed and in some cases the merchants had the metal refined.¹⁸

A diachronic change in terminology is apparent; in texts from the Level II period *šarrupum* is used in the majority of cases where a silver qualification is added and *ammurum* is relatively rare and *dammuqum* even more so. The (sparse) evidence from Level Ib (only about 2 % of all texts found at Kültepe stem from this period) consists of 15 texts with a silver qualification distributed as follows: *šarrupum* is attested once, *šaḥarba* twice, *tirum* twelve times; this shows that *tirum* took over the role of *šarrupum* as a general indicator of quality or shape and it continues to be used in the subsequent Middle Assyrian period. The Anatolian form *litum* has not yet been attested in documents from Level Ib and may not have been used anymore.

Copper (Akkadian: *werium*, logographic writing: urudu) was traded in many varieties: *masium* “washed, refined”, *dammuqum* “good”, *lammunum* “poor”, *šikkum* “?”, *šallāmum* “black”. Good qualities include copper with an indication of origin (shape of ingot, stamp): Ḫaburata, Taritar, Tišmurna. Good copper cost about 60 shekels of copper for 1 shekel of silver, poor copper about 150 (for prices, see DERCKSEN 1996, 227).

Tin (Akkadian: *annakum*, logographic writing an-na): sealed packages for export to Anatolia were bought in Assur, as well as unsealed lumps of tin (“hand-tin”) to pay expenses *en route*. Prices in silver in Assur range from 17 ½ shekels of tin per shekel of silver to 12. Prices in Anatolia range from 11 ½ to 4 (DERCKSEN 2014, 106-109). Assyrian merchants considered a price of 6 (1 talent of tin = 10 minas of silver) as being fair and used it in their calculations.

14 CCT 2, 2: (4) 16 ma-na kù-babbar i-dí-si-en (5) ub-lam ša-ba ½ ma-na kù-babbar (6) a-mu-ru-um nepišam ša id-din-suen ublanni maḥar kulumaya apturma ½ mana 1 ½ gín kù-babbar batiq ša-ab-ra-tum (10) na-bi-a i-na mi-ta-hu-ri-im (11) e ta-li-ib “Iddin-Suen brought 16 minas of silver. Of this, 50 shekels is *ammurum* silver. I unpacked the packet that Iddin-Suen brought in front of Kulumaya and 21 ½ shekels turned out to be lacking. The ingots are (too) big, when you receive (them) you must not ...”; see also LARSEN 1967, 118; VEENHOF 2014, 401-403.

15 CCT 4, 2a: (7) ... 6 ma-na (8) kù-babbar hu-ša-e <<e>> sig, “6 minas of good quality silver scrap”.

16 AKT 9A, 11: (14) al-kam-ma kù-babbar (15) ša a-ḫi-kà (16) i-na hu-li-kà (17) bu-ti-uq-ma “Come here and cut off the silver of your brother from your torque”.

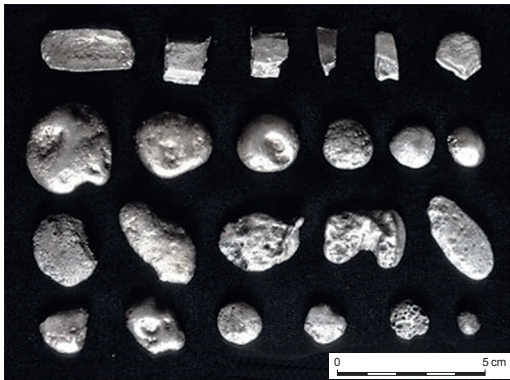
17 See, for example, AKT 8, 9: (1) 1 né-pí-šu-um 10 ma-na (2) kù-babbar ni-is-ḫa-sú diri (3) ša-du-a-sú ša-bu (4) i-a-um a-na um-me-a-ni-a (5) an-na i-ša-ú-mu-nim (6) 5 ma-na kù-babbar a-ḫa-ma (7) ni-is-ḫa-sú diri (8) ša-du-a-sú ša-bu (9) ša dam-gār ku-ta-ni i-ša-ú-mu-nim (10) 1 ri-ik-sú-um (11) šī-im 2 ku-ta-ni-šu (12) a-na ḫa-ti-a (13) 1 ri-ik-súm ½ ma-na 5 gín (14) šī-im ku-ta-nim a-na (15) i-li-a 1 ri-ik-súm (16) ½ ma-na a-na né-er-am-tim (17) 1 ri-ik-súm (18) ½ ma-na a-šī-ma-at-ištar (19) 13 gín a-na (20) kur-ub-ištar mi-ma a-nim (21) a-na a-šur-lá-ma-si (22) ap-qí-id “(1-5) One packet of 10 minas of silver, its excise added, his transport fee paid, belonging to me, for my investors; they will buy tin for me. (6-9) Separately 5 minas of silver, its excise added, his transport fee paid, belonging to the merchant; they will buy *kutānum* textiles for me. (10-12) One bundle (of silver), the price paid for his two *kutānus*, for Ḫatiya; (13-15) one bundle (containing) 35 shekels (of silver), the price paid for a *kutānum*, for Iliya; (15-16) one bundle containing 20 shekels (of silver) for Ner’amtum; (17-18) one bundle containing 20 shekels (of silver) for Šimat-Ištar; (19-20) 13 shekels (of silver) for Kurub-Ištar. (20-22) All this I entrusted to Aššur-lamassi (witnessed by two persons)”.

18 AKT 6B, 371 (in Kanesh), leading to a loss of 5.5 %: (3) 1 ½ ma-na kù-babbar ša m. (4) ub-lá-ni kù-babbar : ma-si-ūḫ (5) nu-ša-id-ma 5 gín im-ti-ma “As for the 1 ½ minas of silver that M. brought, the silver was impure and we therefore melted it and (as a result) 5 shekels were lost.”

► Fig. 1. The 1992 silver hoard from Acemhöyük, Anatolia (photo by courtesy of A. Öztan).



► Fig. 2. Selected ingots in the 1992 silver hoard from Acemhöyük, Anatolia (photo by courtesy of A. Öztan).



Tin functioned as standard of value in the system of declared value (*awītum*) defined in Assur (see below). Beads of tin (*hiddum*) were used as money.

1.5 Archaeological evidence

The money of the Old Assyrian period has vanished, but some related artefacts have been excavat-

ed at several places and include moulds for the casting of bar-shaped and other ingots and some bracelets and rings. The artefacts discussed here all relate to silver. Contemporary hacksilver was excavated in Acemhöyük (Level III) in 1982 (a jar containing 22 pieces, total weight 250 g; see ÖZGÜÇ 1995) and in 1992. The hoard from 1992 (Fig. 1-2) was found in a pitcher and consisted of ingots, rings, a cup, a pin and some scrap, in all 210 items with a weight of 1804 g (ÖZTAN 1997).

From Kültepe stem several stone moulds and silver and gold rings and silver bracelets. The *litum* of silver may perhaps be compared to one of the two types of mould discussed here. The first type of mould, discussed by MÜLLER-KARPE (1994, 141-142), is marked with a cross-shaped symbol (+, to divide the ingot into halves or quarters) in which circular ingots were cast. Five moulds with such a mark are known from Kültepe, four of which were found in Lower Town Level II (Tab. 1).

The interpretations in the last column correspond to those of Müller-Karpe, who regarded no. 29 as a mould for a silver ingot with a mass of 1 ½ minas. If the estimated weights are correct, the marked moulds hardly represent units based on the Anatolian weight (shekel of c. 11 g, mina of c. 450 g), but instead are based on the Mesopotamian shekel of 8.3 g used by the Assyrian merchants. The mould from Malatya stems from the early 3rd millennium BC, which makes it doubtful whether it really belongs to the same standard as the ones from early 2nd millennium Kültepe.

The second type is represented by at least two moulds for multiple bars marked with nipples. From Level Ib stems Kt f/k 78 with room for five bars (Fig. 3), each with six or seven nipples

▼ Tab. 1. Moulds containing a mark for casting silver.

No. in MÜLLER-KARPE 1994, 141 tab. 1	Marked	Estimated weight in silver	Interpretation
9 (Kültepe Lower Town II)	+	39.9 g	5 shekels (Assyrian)
10 (Kültepe Lower Town II)	+	39.9 g	5 shekels (Assyrian)
14 (Troja)	+	168 g	20 shekels (Assyrian)
[25 (Malatya, Arslantepe VI)	+	525 g	1 mina (Assyrian)]
26 (Kültepe Lower Town II)	+	252 g	½ mina (Assyrian)
27 (Tarsus)	+	--	
28 (Kültepe Lower Town II)*	+	--	
29 (Kültepe "Lower Town")	+	798 g	

* Photo in ÖZGÜÇ 1986, pl. 86 no. 3; description on page 43: Kt 82/k 157 from a Level II workshop, Room 1, length 9.9 cm, width 3.3 cm.

(ÖZGÜÇ 1986, 47, pl. 92 no. 4 with modern ingots; KULAKOĞLU/KANGAL 2010, 278 no. 258). MÜLLER-KARPE (1994, 138-139, drawing on pl. 37,3) measured the volume of each bar as about 4.8 ml, and concluded that only when filled with silver, the weight of a bar (about 50 g) equals that of 6 Assyrian shekels *and* the number of nipples on the bars (the bar with seven nipples is at the sprue and slightly longer): “Somit dienten diese ‘Warzen’ als einfache Zahlzeichen, als Markierungen für den Wert und wohl auch als Anhaltspunkte zum Teilen eines solchen Stabes in Stücke zu je 3, 2 oder 1 Seqel.” A second mould, observed on the surface of the Lower Town by the author in 2013, has four bar negatives the largest of which contains ten nipples (Fig. 4). Use of this type of mould seems to be limited to the Level Ib period. No bars marked with such nipples or fragments thereof have been found.

A small number of silver bracelets have been excavated at Kültepe, all in tombs (ÖZGÜÇ 1986, 30; KULAKOĞLU/KANGAL 2010, 312-313 no. 354-355, 359-361). A bracelet of irregular shape with grooved ends is marked as Kt 84/k 93 (Fig. 5) (ÖZGÜÇ 1986, 30; KULAKOĞLU/KANGAL 2010, 313 no. 361). Lead isotope analyses of a silver bracelet from Grave 20 in Assur and items from a silver hoard excavated at Acemhöyük point to an origin in the Central Taurus (YENER 2007; 2015).

2 Money in Kanesh and other towns in Anatolia

2.1.1 Money in the trade

Kanesh was the capital city of a kingdom of the same name. In its territory lay an unknown number of villages and hamlets (BARJAMOVIC 2014). The economy was based on agriculture and animal husbandry (DERCKSEN 2008), with barley and wheat being its most important products, as well as wool and the textiles manufactured from it. Kanesh profited from being the hub of the Assyrian trading network in Anatolia. The Assyrian merchants lived in the Lower Town where they acquired houses (HERTEL 2014). As most of them lacked land to grow barley or vegetables for own consumption, they depended on the purchase of food.

The availability of money was essential for trade. Supply of silver was cut off or severely reduced in the absence of foreign traders, during *sikkatum*, harvest, and warfare.¹⁹ So, for example in Kt n/k 1689: “My ware has been sold and copper is available. The *sikkatum* went out and there is no silver or gold on the marketplace”. Merchants obtained information about markets through their agents and partners; communication across Anatolia and



▲ Fig. 3. Stone mould for marked bars from the Lower Town (Level Ib) at Kültepe, Anatolia. Material: steatite, length 9.4 cm, width 6.7 cm (KULAKOĞLU/KANGAL 2010, 278 no. 258; © Directorate of Kültepe-Kanesh Excavations).

between Anatolia and Assur was possible due to high level of literacy and a seasonally dependent lively network of envoys and travellers who could convey letters.

The range of goods a merchant could receive as a means of (indirect) exchange emerges from AKT 6C, 617, according to which an Assyrian “sold five textiles out of the twenty textiles available for 5 talents 50 minas of *sikkum* copper and one textile for 3 ½ shekels of gold. Amur-Ištar sold two textiles for 1 talent 10 minas of washed copper. We sold six textiles for 2 ½ minas 4 shekels of silver.” The copper would be sold for silver subsequently. Often merchandise was entrusted to a retailer for a fixed price and term, this being the origin of many of the debt-notes with an Assyrian trader listed as debtor. In these debt-notes, the price was expressed in refined (*šarrupum*) silver; when copper is stipulated, it signifies that the owner of the goods wanted copper. In both cases, the refined silver and copper are a means of deferred payment.

▼ Fig. 4. Stone mould for marked bars from the Lower Town (Level Ib?) at Kültepe, Anatolia (photo by the author, reproduced by courtesy of F. Kulakoğlu).



¹⁹ The meaning of *sikkatum* is uncertain. It refers to an event whose beginning and end are more or less predictable; it has been interpreted as “war”, “army”, “conflict”, as a festival, and as a fair held outside the city wall, see BARJAMOVIC *et al.* 2012, 43.



▲ Fig. 5. Silver bracelet from the Lower Town (Level Ib tomb) at Kültepe, Anatolia. Length 8.5 cm, diameter 5.8 cm, thickness 0.8 cm (KULAKOĞLU/KANGAL 2010, 313 no. 361; © Directorate of Kültepe-Kanesh Excavations).

The chain copper → silver and copper → gold → silver is exemplified by KTS 1, 18: “The goods entered the palace and the palace pre-empted 17 *makuḫum* textiles of Puzur-Aššur and three of your textiles for 20 minas (of copper) a piece. The palace took 420 minas of refined copper at 2:1 and we will collect the copper at the Office of the Colony. Today, the palace paid us in full the copper as proceeds of textiles and the good quality copper, but it did not give us any for that of the majority. Do not be angry. All textiles that could be sold have been sold. We will sell tin and copper and acquire at least 10 minas of silver and send Adu as soon as possible. Do you not hear that silver is hard to obtain here? You wrote in your tablet: Sell my merchandise at any price and then leave! There is gold as proceeds; let us obtain gold for you. We will stay for one or two months and obtain silver for you. We refused to accept gold (until now) because you had not instructed us to do so.”²⁰

The standard silver quality that the Assyrians used to record financial obligations during the Level II period was *šarrupum*. This may well refer to the silver value of the debt, and payment in silver was expected, but could also be realised in a different form. A good example of the use of the word “silver” forms TC 3, 2: “The remainder of your tin is 6 talents 55 ½ minas. At a rate of 8 %, its silver (value) is 46 minas 50 shekels. Four fine *kutānum*

textiles have been sold for 1 mina 45 shekels. The total of your silver is 48 minas 33(!) shekels. From this Al-beli is bringing you 42 minas of silver under our seal. The rest of your silver is (in the form of) gold. We will sell the gold.”²¹ Silver as a standard of value is used twice: first for the proceeds of the sale of tin, which turns out to consist of silver and partly of gold; the second time to indicate the remaining silver, which consists of gold yet to be sold. Real silver is sent with Al-beli.

Remelting of silver was done by smiths (*nappāhum*). Refining (*masā’um*) and casting of silver seems to have been the standard procedure before it was sent to Assur; this involved losses in metal and the payment of a wage to the smith.²² Smiths were instrumental in the exchange of metal at a local level. This is implied by AKT 2, 26, according to which 10 minas of good copper from Taritar is sent to a woman, presumably in Kanesh, and the sender of the copper is anxious that expert people assist her in case the smiths should deprive her of 1 or 2 shekels (of silver).

Silver was the standard of value in Assyrian contracts: the price of the goods was expressed in silver as was the financial penalty in the case of breach of contract. Also divorce money was expressed in silver. All kinds of daily commodities were purchased and their prices were usually given in silver. This results in documents recording how, for example, ¼ of a shekel of silver was spent on onions – which immediately raises the question of whether silver had been used or not.

At times, large quantities of barley are mentioned in the records of the merchants. It functioned as a means of (indirect) exchange²³ and the merchants sought to sell it at a profitable price.²⁴

21 TC 3, 2: (9) ... *šit-ti* (10) *an-na-ki-kà* 6 gú 55 ½ *ma-na* (11) 8 % *gin-ta* *kù-babbar-bi-šu* (12) 46 % *ma-na* 4 tóg *ku-ta-nu* (13) *sig, a-na* 1 ½ *ma-na* 5 *gin* (14) *ta-ad-nu* *šunigin* *kù-babbar-pi-kà* (15) 48 ½ *ma-na* 3 *gin* (16) *ša-ba* 42 *ma-na* *kù-babbar* (17) *ku-nu-ki-ni al-be-li* (18) *na-ās-a-ku-um šit-ti* *kù-babbar-pi-kà* (19) *kù-ki i-ba-ši kù-ki ni-da-an-ma*.

22 For losses, see DERCKSEN 2005, 24; VEENHOF 2014. Small payments to a smith such as that of ¼ shekel of silver in AKT 8, 344:7 may well be the costs for refining and casting silver or other metal.

23 BIN 4, 45: (24) ... *a-na a-mu-tim* (25) *ša il₅-we-da-ku ša a-na a-lá-bi-nim* (26) *i-dí-nu-ni a-ma-lá i-mi-ig-ru-ni* (27) *lá i-de₈ āš-ta-na-me i-ba-ti* (28) *wa-aḫ-šu-ša-na še i-da-šu-nu-ti* “I do not know what they agreed on (as payment) for the *amutum* iron that Il-wedaku sold to the *alahhinum*. I hear rumors that he (wants) to give them barley outside of *Wahšušana*”.

24 The prices for wheat and barley show considerable fluctuation: 1 pot of wheat costs between 1 shekel 15 še and 4 ½ shekels of silver; 1 pot of barley costs between ¾ shekel and 2 ¾ shekels. Two texts have an Assyrian buy barley at ¾ shekels of silver per pot (AKT 8, 343:3.11) and 1 ½ shekels (AKT 8, 345:17) and 1 shekel 75 še (AKT 8, 345) and wheat at 1 ¼ shekels (AKT 8, 343:1.14) and 1 ½ shekels per pot (AKT 8, 345:20.27). The sale of 600 (pots) of wheat for 28 minas of silver (a little over 2 ¾ shekels per pot) is reported in BIN 4, 41:23-24. But the price of 40 sacks (= 160 pots) of wheat is given as 12 minas of silver at 4 ½ shekels per pot in ATHE 12:22-25 (among Assyrians in Kanesh).

20 KTS 1, 18: (3) ... *ú-nu-tum* (4) *a-na é-gal-lim e-ru-ub-ma* (5) 17 tóg *ma-ku-ḫi ša puzur₄-a-šur* (6) 3 tóg *ku-a-ú-tim é-gal-lum* (7) 20 *ma-na-ta a-na šit-mi-im* (8) *il₅-qé 4 me-at* 20 *ma-na urudu* (9) *ma-as-am é-gal-lum a-na* (10) *šit-mi-im ša-na-um il₅-qé-ma* (11) *urudu i-na é-kà-ri-im ni-lá-qé-ma* (12) *urudu šit-im tóg-ḫi-a ú urudu sig, u₄-ma-ma* (13) *é-gal-lum ú-ša-bi-ni-a-ti-ma* (14) *mi-ma a-na ša na-am-e-dim* (15) *lá i-dí-ni-a-ti li-ba-kà* (16) *lá i-ma-ra-aš i-na* (17) *tóg-ḫi-a ša ta-da-nim ta-ad-nu* (18) *lu an-na lu urudu ni-da-ma* (19) *kù-babbar 10 ma-na né-pá-ās-ma* (20) *iš-ti wa-ar-ki-ú-tim a-du-ú* (21) *ni-tá-ra-dam lá ta-ās-ta-na-me-e* (22) *ki-ma kù-babbar-pu da-nu-ni* (23) *ú a-na tóg šit-mu-um lá i-ba-ši-ú* (24) *kù-babbar-pu a-na-kam da-nu i-na* (25) *tup-pi-kà um-ma a-ta-ma šit-mi* (26) *ba-ti-iq ú wa-tur₄ di-na-ma a-tal-kà-nim* (27) *a-na šit-mi-im kù-gi i-za-az* (28) *kù-gi lu né-pu-ša-kum itu-1-kam* (29) *iš-té-en₆ ú 2 itu-kam ni-sà-ḫu-ur-ma* (30) *kù-babbar né-pá-ša-kum ki-ma lá té-er-ta-kà* (31) *kù-gi lá-qá-am lá ni-mu-a*.

Audience gifts presented to kings of Anatolian towns usually consisted of textiles and gold, but other objects occur as well, such as carnelian.²⁵

2.1.2 Shapes and qualifications of money in Anatolia

The shape of metal used as money is rarely indicated. In exceptional cases a reference is duplicated in another text where the shape or quality is added. This occurs with the only mention of scrap silver attested so far in CCT 4, 2a, and the same silver is simply called *kù-babbar* “silver” in the parallel text Pa. 10 (L29-563).²⁶ This is only one case, but it suggests that scrap silver was used on a much larger scale for consignments to Assur. Apart from its availability, the reason might be that metal worked into an object generally had a higher purity than complete or broken ingots.²⁷

Beads (*hiddum*) of silver and gold were accepted as a means of (indirect) exchange and seem only attested in texts from Level II.²⁸ Their weight is never mentioned and suggests a more or less standardised mass. One gold bead is the price of a *kutānum* textile (normal price 20-30 shekels of silver) in AKT 11A, 51.²⁹ An unknown number of textiles is sold for 13 beads to a palace according to Kt a/k 405:10-13. Silver beads with an average weight of 3 shekels (c. 25 g) are obtained in exchange for copper in Kt u/k 3.³⁰ Gold beads with an average

weight of about 3 shekels apiece constitute 2 ½ minas of *pašallum* gold that cost 58 minas of copper per bead according to Kt c/k 263.³¹ Prices in copper are difficult to evaluate without any indication of the copper quality. 40 minas of copper is the price of a gold bead in AKT 8, 258:20-21.³² Other prices in copper can be found in AKT 11A, 46: 28 minas for a gold bead and 5 minas for a silver bead.³³ The shape of the beads made it possible to use beads cut in half.³⁴ Beads of silver and gold were a common feature in Anatolia, as payments by palaces and various Anatolians demonstrate.³⁵ It is therefore possible that moulds to cast such beads were used in Kültepe during the Level II period.

Tin beads occur as an audience gift (one bead to the *alahhinum* of Taedizina, see below).³⁶ A quantity of “2 minas 3 tin beads”, meaning 2 minas of tin and 3 beads of tin is attested in broken context in Sadberk Hanım 16:7.

Merchants obtained beads, but also had gold worked into beads.³⁷ Although worked metal generally was considered to be of good quality, and at times preferred over unworked metal, sometimes poor quality beads turn up.³⁸

Pašallum gold circulated in the shape of beads (see above) and bracelets (*annaqum*), which makes the translation “nugget” impossible here.³⁹

25 AKT 8, 221: (23) *a-ma kù-gi 15 gín ú 1 ma-na* (24) *sà-am-tum ma-lá ta-le-a-ni* (25) *é-gal-lam tá-i-ba* “Here are gold, 15 shekels, and 1 mina of carnelian, appease the palace as well as you can” (transl. VEENHOF 2017a, 323).

26 CCT 4, 2a: (3) *i-na kù-babbar ša ik-ri-bi₄-a* (4) *ša 1 ma-na kù-gi ša-am-ša-am* (5) *a-na a-šur e-ep-ša-am* (6) *ni-is-ša-sà a-ša-ma* (7) *ku-un-kà-am* 6 ma-na (8) *kù-babbar hu-ša-e <<e>> sig*, (9) *ú ni-is-ša-sú a-na* (10) *šīstar ku-un-kà-am* “Of the silver from my votive offerings you should make me a sun-disk for divine Aššur, weighing 1 mina of gold. Seal the import duty separately. Place 6 minas of good quality scrap silver plus its import duty, for divine Ištar, under seal.” Pa. 10: (13) *ša-am-ša-am ša* (14) *1 ma-na kù-gi* (15) *a-na a-šur ha-bu-lá-ku* (16) *i-na ik-ri-bi₄-a* (17) *ep-ša-am* 6 ma-na (18) *kù-babbar a-na šīstar* (19) *i-na li-bi₄ ik-ri-bi₄-a* (20) *bi₄-lam* “I owe divine Aššur a sun-disk of 1 mina of gold. Make it (with money) from my votive offerings. Bring me 6 minas of silver for divine Ištar out of my votive offerings.” Translations taken from the edition in LARSEN 2002, 31, 33.

27 This could be expressed in the price of the metal, as in the Laws of Eshnunna, where 1 shekel of silver equals 180 shekels of copper, but only 120 shekels of worked copper (urudu *ep-šum*), see REITER 1997, 194. See also the price of 40 for zi-ir copper in JCS 41 (1989) text 3, but 90 and 97 for “copper” in Assur, section 3.1.

28 For *hiddum*, see ARKHIPOV 2012, 45 (Mari); 2018, 61.

29 AKT 11A, 51: (9) *10 túg ku-ta-nu hi-dá* (10) *a-na kù-ki ta-[ad-nu]* (...) (20) *1 ma-na 5 ½ gín kù-babbar* (21) *ú 10 hi-dim kù-ki* (22) *i-dí-ni-a-ti* “Ten *kutānum* textiles were sold at one bead of gold each (...) He gave us 1 mina 5 ½ shekels of silver and ten gold beads.”

30 Kt u/k 3: (16) ... *7 me-at 60 ma-na* (17) *12 ma-na ta-a-na hi-dim kù-babbar i-na ab-na-ti-ni* (18) *ú urudu i-na ab-na-ti-ni šunigin kù-babbar-šu* (19) *3 ma-na 10 gín kù-babbar* “760 minas (of copper) at 12 minas per silver bead according to our weight stones and the copper according to our weight stones, in all its silver is 3 minas 10 shekels”. This results in 63 ½ beads (if all complete beads are of same weight, which is uncertain).

31 Kt c/k 263: (29) *2 ½ ma-na kù-ki pá-ša-lam* (30) *a-lu-lá-a ú ta-ki-lá-a a-sé-er* (31) *a-šur-dug a-kà-ni-iš ub-lu-nim* (32) *šī-im kù-ki* 58 ma-na-ta (33) *šī-im-šu* 53 gú 10 ma-na “Alulaya and Takilaya brought 2 ½ minas of *pašallum* gold to Aššur-tab in Kanesh; the price of the gold was 58 minas (of copper) each (bead), its price 53 talents 10 minas (of copper)”.

32 AKT 8, 258: (20) *um-ma šu-nu-ma* 40 ma-na-e-ma (21) *šī-im hi-dim kù-ki a-bu-ni* (22) *ha-bu-ul um-ma a-na-ku-ma* (23) *40 ma-na šī-im hi-dim kù-ki* (24) *ú 23 ma-na šī-im an-na* (25) *iš-té-ni-iš* 1 gú 3 ma-na (26) *a-bu-ku-nu ha-bu-ul* “They said: Our father owes only 40 minas as the price of the gold bead. I replied: 40 minas as price of the gold bead and 23 minas price of the tin, in all your father owes 63 minas (of copper)”.

33 AKT 11A, 46: (19) *ma-hi-ra-am lá ta-dá-ga-al* (20) *ki-ma a-na hi-dim* (21) *kù-ki* 28 ma-na-ta (22) *i-za-zu a-na hi-dim* (23) *kù-babbar* 5 ma-na-ta *i-za-zu* “Do you not observe the market (situation) that for one gold bead 28 minas (of copper) stand and for one silver bead 5 minas (of copper)?”

34 AKT 6B, 512: (3) *14 hi-dim* (4) *sú-sà-a-a* (5) *dumu na-áp-ra-kà* (6) [2] ma-na *2 ½ hi-dim* (7) *i-zi-iz:me-šar* “14 beads: Susaya son of Napraka, 2 minas 2 ½ beads: Izziz-Mešar.” AKT 9A, 94: (44) *2 ½ ma-[na] [ú]* *1 ½ hi-dim kù-babbar* (45) *iš-ti [ha-li] iš-kà* “Hališka owes 2 ½ minas (of silver) and 1 ½ beads of silver”.

35 See also the debts of quantities of silver plus a number of silver or gold beads listed in AKT 6A, 151.

36 AKT 8, 146: (20) ... *hi-dam an-na a-na* (21) *a-lá-hi-nim ša ta-e-dí-zi-na* (22) *a-dí-in* “I gave one tin bead to the *alahhinum* of Taedizina” (in Anatolia).

37 Pušu-ken’s wife Lamassi writes him from Assur in VS 26, 42: (19) ... *kù-gi* (20) *ša bu-za-zu ša té-zi-bu* (21) *hi-dí a-na a-ša-ša e-pu-uš* “Make beads for Aḫaḫa (with) the gold of Buzazu that you left behind”.

38 AKT 6B, 348: (34) ... *hi-dam kù-gi ša a-na* (35) *sú-ha-artim tú-šé-bi₄-lá-ni ma-sú-ùḫ-ma ú* (36) *lá-qá-am la ta-mu-a* “The bead of gold you sent to the girl was impure and therefore she refused to accept it”.

39 AKT 8, 268: (6) *1 ½ ma-na* 3 gín *kù-ki* (7) *pá-šál-lam sig, a-ni-qi* “83 shekels (about 690 g) of good *pašallum* gold (in the shape of) bracelets”.

Copper was cast in ingots of distinctive shape identifying the place of origin; good quality copper and presumably also other types of copper were often broken up into smaller pieces (DERCKSEN 1996, 40-41).

2.1.3 Wages

Assyrian documents regularly refer to copper or silver paid for a service, in which the money functioned as a means of payment. Engagements that lasted for some time involved caravan personnel and attorneys. The men hired to assist in the caravan trade as harnessers (*kaššārum*) were contracted in Assur or Kanesh and received a “working capital” (*be’ulātum*), usually expressed in silver, which functioned as an interest-free loan.⁴⁰ Someone hired in Kuburnat, a copper-rich region in Anatolia, received it in copper (AKT 6C, 686:6).

The *rābišum* or “attorney” was hired in Assur to assist relatives of a deceased merchant in Anatolia in recovering as much of the still outstanding claims at the time of his death as possible. The attorney received half of the agreed salary in Assur and the other half upon completion of his mission; food and travel expenses were covered by the client. The full hire (*igrū*) of an attorney ranged from 30 to 55 shekels of silver.⁴¹

People involved in smuggling merchandise (*mupazzirum*) were also paid a wage in silver according to distance and the number of goods to be smuggled.⁴²

Envoys, often carrying letters and other tablets, received compensation in silver: 5 shekels (BIN 4, 83:52); 2 shekels (BIN 4, 202:4-5). It was possible to hire Anatolian porters in Kanesh and elsewhere to carry or accompany merchandise; their pay was in copper and silver.⁴³ The distance is rarely mentioned and an exception to this is AKT 8, 147 (Kt 92/k 3):21-24 “From Karaḥna until Kuburnat the costs of porters amounted to 3 shekels of silver.” (VEENHOF 2006, 780). Wagons were also rented (DERCKSEN 1996, 65).

Artisans and other specialists, such as builders in Anatolia,⁴⁴ were paid for their work.

2.1.4 Travel expenses in Anatolia

Payments to inns (*bēt wabrim*), toll, and rent of wagons and boats were made with copper, silver and even with tin (BARJAMOVIC *et al.* 2012, 36-37 tab. 5). The variety in the use of metal will be illustrated by two texts published by VEENHOF (2006) (Tab. 2).

Other documents contain more occasions of payments in copper. However, the many payments in tin and the few in copper in these two texts apparently depend on the geographical location of the trading journey: in the first text, the merchant is heading for the copper market at Durḫumit. Until he comes to that town, he pays with tin, but from Durḫumit onwards, he uses copper. The second text refers to a journey from the south-east of Kanesh to the north-east of it, when apparently no merchandise had as yet been sold for copper.

2.1.5 Money in the Office of the Colony in Kanesh

The Assyrian merchants settled at Kanesh fell under the jurisdiction of the organisation of merchants called *kārum* (lit. ‘the Port’), which in turn received its instructions from Assur. This organisation had the Office of the Colony (*bēt kārim*) as its centre, where the merchants would hold meetings convened by the Colony’s secretary (LARSEN 1976, 283-307). Representatives were elected from among the merchants. Through an as yet unclear mechanism deferred payments by the palace of Kanesh were made through the Office of the Colony; this involved large quantities of copper. This institution influenced the use of money in several ways, by keeping standard balance weights and (although undocumented) facilitating weighing procedures, and by fixing a (non-mandatory) rate of interest of 30 % per year. A special group of registered merchants, some of whom lived in Assur, made large annual contributions to the Colony, the so-called *dātum*, known amounts of which vary from 12 to 37 minas of silver. This was paid on various occasions by making deposits of textiles and silver (DERCKSEN 2004, 119-147). The political and commercial activities of the Office of the Colony necessitated expenditure and the organisation did at times borrow silver from its constituency and paid interest on it.⁴⁵ The colony of Kanesh received

40 VEENHOF 1994, 181-184; DERCKSEN 2014, 99-101. For a list of *be’ulātum* hire in the archive of Elamma, see VEENHOF 2017a, 83-85.

41 VEENHOF 1994, 182-183; DERCKSEN 2014, 103-104. Recently published data: 40 shekels, AKT 6A, 235:35-37 (20 in Assur, 20 shekels in Kanesh); 48, AKT 6A, 244:30ff. (28 already given, 20 yet to receive; 8 shekels travel expenses).

42 “Zupa and Adad-bani are smugglers, give them 10 shekels of silver as their hire”, AKT 6C, 661:9; “2 shekels smuggling of *kutānum* textiles”, Kt n/k 723:15; 7 ½ shekels of silver, AKT 6C, 633; “10 and 23 shekels of silver I gave to smugglers for P.”, Kt c/k 1463.

43 DERCKSEN 1996, 61-63; 2014, 101-103; people from Kanesh receiving silver for their service occur in, for example, CCT 2, 40 and AKT 11A, 106 (GÜRKAN GÜKÇEK 2006, 188 Kt 92/k 313): 21 shekels of silver. KTS 1, 10: 1 ½ gin-ta (11) kù-babbar *ig-ri-šu-nu* (12) *dī-na* “Give each man 1 ½ shekels of silver as their hire” (to Piṭḫala and Watkan bringing 21 garments). AKT 9A, 122: “They gave 55 shekels of copper to the boys who brought the copper”.

44 AKT 6A, 273:36: “When they built a house in front of the grave where our father is buried, my expense was 2 talents of copper, and 15 minas of copper was the wages of the builder (*ig-ri e-ti-nim*)”; AKT 6A, 274: “10 ½ shekels of silver for *aluranum*, 3 shekels for thin boughs, 3 shekels for stone, 2 shekels hire of the builder (*ig-ri i-ti-ni-im*)”.

45 See DERCKSEN 2004, 107-110. CCT 2, 25: (5) kù-babbar *lu i-na é kà-ri-im* (6) *i-ḫa-šu-ḫu lu a-na um-me-a-nim* (7) *ke-nim ša ki-ma ku-nu-ti* (8) *ša lá ša-ḫa-tim* kù-babbar *pu-ut-ra-ma* (9) *a-na šī-ib-tim dī-na-ma* (10) kù-babbar 1 gin *šē-li-a-nim* “Whether they need silver in the Office of the

copper and silver that was levied by other Assyrian settlements in Anatolia (DERCKSEN 2004, 110-113).

2.1.6 Money in households: Budgets, dowries, gifts, and the division of property

Letters, marriage and divorce contracts, and private notes inform us about the marriage of Assyrian merchants to Assyrian or Anatolian women and how the households in Kanesh (or other towns) were organised.⁴⁶ Many Assyrians married a local woman, who was called *amtum* (lit. female slave) to differentiate her from a wife (*aššatum*) in Assur. When the merchant was away for business, the *amtum* wife took care of the household and like other women in a similar situation received copper⁴⁷ or silver⁴⁸ to purchase food and firewood from her husband or his representatives. Instead of money, the women often were given grain and additional food supplies by other Assyrians at the request of the absent husband;⁴⁹ these deliveries in kind were part of the men's business and therefore carefully recorded in preparation for a future settling of accounts. Some of the Anatolian wives of merchants had access to money which allowed them to become economically active themselves, e. g. by purchasing slaves, providing loans to others (see below), and in some cases even participating in the trade of their husband. For example, Laqep asked his *amtum* wife Hūatala to collect 9 shekels of silver owed by the wife of another Assyrian and to pay this to an Anatolian creditor (ICK 1, 69); according to a different text Hūatala gave 6 shekels of silver to a man to make purchases (ICK 1, 67). Nakilwišwe, the wife (*ašša-*

Colony or whether to a trustworthy merchant who is like yourselves and whom you do not have to fear, unpack the silver and give it at interest, make every shekel of silver available to me!" (similarly, in VS 26, 69, same sender). See also AKT 7A, 184: (1) 17 ma-na lá 17 gín (2) kù-babbar ša i. (3) 1 ma-na 17 gín (4) kù-babbar ša a. (5) nu-ra-dí-ma (6) 18 ma-na (7) kù-babbar ša-ru-pá-am (8) a-na šī-ib-tim (9) a-na kà-ri-im (10) ni-dí-in (11) 1 ½ gín-ta i-itu-l-kam (12) a-na 1 ma-na-im (13) ú-šú-bu "(To) 17 minas minus 17 shekels of silver belonging to I, we added 1 mina 17 shekels belonging to A, and then gave 18 minas of refined silver at interest to the Colony. They will add 1 ½ shekels per month to each mina" (30 % per year).

46 On Old Assyrian marriage contracts, see KIENAST 2015; VEENHOF 2018.

47 A mother is promised 5 or 6 minas of copper, while 1 ½ minas had already been sent to her according to LB 1209 (DERCKSEN 2009). A man who was staying in Kanesh was ordered by the Colony of Waḥšušana to provide his wife with 8 minas of *šikkum* copper per month for food, oil, firewood, Kt 88/k 269 (DERCKSEN 2014, 98-99).

48 Aššur-nada sent 21 shekels of silver to Šišahšušar with the order to buy wood and reeds with it (VS 26, 20); Šu-Ištar writes in CCT 4, 16b: (22) 10 gín kù-babbar a-na am-tim (23) dī-in lá ta-kà-lá "Give 10 shekels of silver to the *amtum*, do not withhold it." According to VS 26, 127, an *amtum* wife received 2, 1, and 3 shekels of silver "since I left Kanesh". See MICHEL 1997 and the letters translated in MICHEL 2020, chap. 6.

49 Asanum writing to Buzazu in CCT 3, 39a: (22) šu-ma géme-tum (23) ú-tá-tám : té-ri-iš-/kà (24) dī-šī-im "If the *amtum* asks you for grain, give (it) to her."

	Copper	Tin	Silver
AKT 8, 146 (Kt 91/k 437)			
inn in Al-Buṭnatim		1 ½ shekels	
inn near Hānaknak		6 shekels	
inn in Hānikka		3 shekels	
inn in Wazida		3 shekels	
tax on textiles in Hānaknak		6 shekels	
inn in Hānaknak		3 shekels	
in Al-Kupilšan		3 shekels	
in Tapaggaš		1 ½ shekels (tin)	
to the <i>alahḫinum</i> in Taḥadizina		1 bead of tin	
river crossing in Durḫumit	30 shekels		
tax in Durḫumit	180 shekels (sig ₅)		
payment to an Assyrian	300 shekels (sig ₅)		
inn and costs in Waḥšušana	600 shekels		
AKT 8, 147 (Kt 92/k 3)			
inn in Hūrama			1 shekel
inn		3 shekels	
inn in Šamuḫa		[broken]	
porter until Šamuḫa			1 ½ shekels
paid in Hatikaitra		3 shekels	
given to Hāsanum in Kutia		1 ½ shekels	
given to commander in Karaḫna		12 shekels	
porters Karaḫna-Kuburnat			3 shekels
tax			6 shekels
inn		2 shekels	

tum) of Aššur-mutappil, bought a female slave for 17 shekels of silver (ICK 1, 123). Female creditors bearing an Anatolian name seem always to be local wives of an Assyrian merchant; for that reason, the transactions are often witnessed by one or more Assyrians, and Assyrian elements are employed in the formulary of the debt-note, such as dating by Assyrian month and eponym. Examples of such women are Anana, Madawada, Šuppialka and Walawala.⁵⁰ The dossier about Madawada will be discussed below, but the three debt-notes of Walawala deserve some comment here. Two were drawn up in the same *hamuštum* week and have the same witnesses: one (Kt c/k 181) is a loan of grain due in autumn and contains the clause "according to the decree of Kanesh" (see 2.3 below). The other (Kt c/k 201) is a loan of silver (15 shekels) due at the festival of the sun-god; the interest rate is 50 % per year and already included in the sum to be paid back. The third is a loan of silver (45 shekels) to an Assyrian (Kt c/k 644) mentioning the usual default interest "according to the decree of the Colony" (30 % per year).

▲ Tab. 2. The use of copper, tin and silver to pay travel expenses.

50 Anana: 47 ¼ shekels of silver, debtors Hūlšan and his wife Azue, ICK 1, 16; 11 shekels of silver, deb. Šadaḫšušar, ICK 1, 24.

Šuppialka: 7 ½ shekels of silver, 1 sack of wheat and 1 sack of barley from Kua, Kt c/k 1417b.

Walawala: 11 sacks of grain, debtors Lurmea and Walwala, Kt c/k 181 (see DERCKSEN 2013, 54); 15 shekels of silver, debtors Lurmea and Walwala, kt c/k 201; 45 shekels of silver, debtor Amur-Ištar, Kt c/k 644.

The position of Ana (wr. *a-na-a*) is unclear to me: 12 shekels of silver and 3 sacks of wheat as interest, debtors Kapitahšu, Perwa, Iatalka, Kt c/k 1440.

The money that Anatolian wives spent, not on domestic consumption, but to buy slaves and other goods, may have been given to them by their husbands. But they also personally owned their dowry and gifts. Details about the dowries of Assyrian and Anatolian wives have been collected by VEENHOF (2018, 28-30). The Old Assyrian term for this gift is *idinnum* and its nature and value varied considerably according to the wealth of the bride's father (or, in his absence, her brothers). It could consist of silver, gold and slaves. Kt 88/k 651 mentions "1 mina of silver and 10 shekels of silver, her rings and her bracelets".⁵¹ When a husband divorced his wife, she would receive the divorce money stated by the marriage contract and keep her *idinnum*. The divorce money varied between 1 mina (AKT 10, 48) and 5 minas (I 490) of silver. A comparable amount occurs in a divorce contract from Level II: 1 mina of silver (TuM 1, 21; Assyrian); smaller amounts are attested in Level Ib texts: 6 ½ shekels (Kt j/k 625) and 15 shekels of silver (Kt k/k 1).

It was customary in Old Assyrian society to give a woman a present of silver on her marriage. Among the documents excavated in 1988 there are several texts recording a gift (*qišṭum*) of 1 ½ shekels of silver to someone's *amtum* or *aššatum* wife on the occasion of her marriage (BAYRAM/KUZUOĞLU 2015). Another document listing in all 36 ½ shekels (of silver) as "all this they presented as a gift to my *amtum* wife" (*mimma annim ana amtia iqišū*) may well reflect the gifts received when she married an Assyrian merchant, as suggested by Ulshöfer.⁵²

The custom of presenting silver as a gift seems to have been a common feature among the Old Assyrian merchants. There appear to have been many such occasions; apart from at weddings, small donations of silver were linked to various religious acts, such as when sheep were offered prior to making a journey, or a deity's festival (DERCKSEN 2011).⁵³

Last wills (VEENHOF 2012) and documents about the division of property mention the possessions of a household. From Level Ib, contracts of brotherhood are known, which deal with the adoption of several men (often married and with

children) by a childless couple to care for them in their old age (VEENHOF 1998).

Men and women of means made arrangements for the division of their property. The last will of Ištar-lamassi (AKT 8, 179 = VEENHOF 2008b, text A) comprises the division of 65 shekels of silver, 2 ¼ shekels of gold and a cylinder seal. A related text reads: "while she was still alive, she opened her (sealed) coffers and they saw every single shekel of silver, her cash assets that were available. And she gave 2 ¼ shekels of gold and 8 shekels of silver to you, 37 shekels of silver to my nephew Iliya, 20 shekels of silver she gave to Ilabrat-bani." (VEENHOF 2008b, 107). Funerary ceremonies cost money (see VEENHOF 2008b; DERCKSEN 2014, 99).

The data on the amount of money mentioned in last wills and some other documents can be summarised in this table (Tab. 3; all texts are from Level II).

It appears from these texts that the average merchant family did not keep much silver or gold in cash to be divided (about 1 ½ minas for Ištar-lamassi, 15 shekels for Zanatin); the case of Elamma's father is exceptional. This is not surprising, as practically all funds would be invested in the trade, to which letters from wives in Assur complaining bitterly about being left in an empty house testify. Silver value was available in outstanding claims and slaves. Selling the house generally was not an option as long as the widow wished to remain in it. The debt-notes were, of course, an uncertain asset, as the claims first had to be collected. Moreover, two of the last wills make it clear that any debt owed by the father had to be settled by his sons, and it remained to be seen whether the result of this settlement would produce a positive balance. It emerges from these cases that there did not exist such a thing as a firm with its own capital; all funds were individually owned. Some of the last wills add to the corpus of evidence about how much money a person needed to survive on a daily basis. This amounted to a few shekels of silver per month (DERCKSEN 2014, 96-99).

Stock-taking of the contents of a household was completed after the death of its main occupant. Often this concerned the amount of barley stored in the house; otherwise the bronze utensils, which in two instances constituted amounts of 77 and 100 minas of bronze (DERCKSEN 1996, 76-78; LARSEN 2015, 196). In a letter written to his representatives, the wealthy merchant Pušu-ken enumerates all the consignments that he sent to his late wife Lamassi in Assur:

"(3-4) Alas! my wife died. (...) (7-8) 1300 units of barley are stored in the silos. (8-10) Enter the house and place sealings on the doors and windows. (10-16) Š. the brother of I. brought her 1 mina of silver, rings of the girl, 18 shekels of gold, her bracelets, 2 decorations of precious stone, beads and toggle pins worth 1 mina of silver, its excise added; (16-17) Z. son of P. (brought) 2 shekels of silver; (17-19) M. and Š. (brought) 70 shekels (of silver); (19-20) the son of

51 Kt 88/k 651: (10) *mī-nam i-dī-<<na>>-ni-ša ni-da-šī-im* (11) *um-ma m.* (12) *ū š.* (13) *a-na p.-ma* (14) *a-li kù-babbar i-na pi-ni* (15) *1 ma-na kù-babbar i-na pi-ni* (16) *ū 10 gín kù-babbar ša-wi-ri-ša* (17) *a-ni-qī-ša i-dī-ni-ša* (18) *qī-bī-šī-im* "What shall we give her as her dowry? M. and Š. replied to P.: where there is silver as we promised, (then) tell her that her dowry is 1 mina of silver as we promised and 10 shekels of silver, her rings and her bracelets."

52 TC 3, 179 edited as ULSHÖFER 1995, 313 no. 367. More examples can be found in VEENHOF 2018, 54.

53 The word *niqium* "offering" (e. g. in BIN 4, 176: 3 gín kù-babbar *ana š. ana niqīšu addin* 1 gín kù-babbar *ana d. ana niqīšu addinšum* "I gave 3 shekels of silver to Š. for his offering; I gave 1 shekel of silver to D. for his offering") can be taken literally in many cases and seems the same as gifts for sheep, in for instance CCT 5, 37a:14: 7 gín kù-babbar *a-na udu-ḫi-a ša é dingir aš-qūl* "I paid 7 shekels of silver for sheep of the temple"; and ICK 1, 4: 1-2,5: 1 ½ gín kù-babbar *ana e-me-ri-šu ana p. ... 2 gín ana e-me-re-šu* "1 ½ shekels of silver for his sheep to P. ... 2 shekels for his sheep".

◀ Tab. 3. Money and other possessions mentioned in last wills and related texts.

The father of Elamma and Ali-ahum, merchant in Assur (AKT 8, 1; VEENHOF 2012, 179-188; 2017a, 1-3)	To be divided among the two brothers: 160 minas of silver, 5,000 measures of barley, 30 and 40 pots as outstanding claims in Assur, a plot of land, a built-on house, the house of Dilaya?, 60 textiles, rugs, cauldrons, bronze objects, male slaves.
Lammasatum, widow of Elamma in Kanesh (AKT 8, 164; VEENHOF 2012, 196-200; 2017a, 226-229)	Left behind by Lamassatum and to be brought to Assur: 1 mina of silver (3 cups and toggle-pins, perhaps her dowry), 26 shekels of silver votive offering of Elamma, 7 debt-notes of in all 7 minas 15 shekels of silver; proceeds of 10 textiles; 5 male slaves, 5 female slaves.
Agua, merchant in Kanesh (Kt o/k 196; ALBAYRAK 2000; MICHEL 2000; HECKER 2001, 28; VEENHOF 2012, 185)	-Wife: house in Assur and her share in the silver; her estate is for Šu-Belum. -Šu-Belum: house in Kanesh. -Sons: will pay all debts owed by Agua. If any assets remain, Ab-šalim may take 20 shekels of gold, 1 mina of silver, 1 female slave. Sons who do not receive a house get 4 talents of copper each. Remaining silver and slaves to be divided between wife and sons. If no silver remains, no copper. Son Abi-ili first has to repay a debt of 10 minas of silver, otherwise he will forfeit his inheritance.
Ili-bani, merchant in Kanesh (ICK 1, 12; VON SODEN 1976).	-Wife: house in Kanesh. -Sons: debt-notes in Assur or Anatolia. Responsible for father's debts; 1 mina of silver votive offering. -Daughter (<i>gubabtum</i> -priestess): 3 debt-notes (of 72 minas of tin, of 1 ½ talents of copper, of 1 ½ minas of silver); two sons have to provide 6 minas of copper to her each year as well as meat from their offerings.
Ištar-lamassi, widow in Kanesh (AKT 8, 179; VEENHOF 2008b, 103; 2017a, 253-255)	- Iliya and Ilabrat-bani: 57 shekels of silver, 2 debt-notes of 45 shekels of silver, their father's 'merchandise', 3 bronze objects. - Daughter (<i>gubabtum</i> -priestess): 2 ¼ shekels of gold, 7 ½ shekels of silver and a cylinder seal.
Zanatin, Anatolian in Kanesh (Kt c/k 843)	-Wife (Walawa): house, debt of 75 shekels of silver of Lamassi, 3 slaves, utensils of the house. -Enna-Aššur: 15 shekels of silver, 1 female slave.
Hurašānum, merchant in Kanesh (RA 88, 121 Brioux; MICHEL 1994; DERCKSEN 1999, 89)	Report on financial situation: creditors in Kanesh have been fully paid. About 60 minas of silver is lost. Has a claim of 40 talents of copper (about 40 minas of silver). Has a claim of 92 minas of silver in several joint-stock partnerships (<i>naruqum</i>).

E. (brought) 3 shekels of gold; (20-21) E. son of Š. (brought) 1 shekel of gold; (22-23) K. (brought) 4 shekels of gold, the divine figurines were sealed in a tablet; (24) H. (brought) 5 shekels of silver; (25-26) A. (brought) 15 shekels of silver for fire-wood (and) 5 shekels as her consignment. (...) (32-34) From this silver half a mina is for the eponym Ibni-Adad (held office in REL 78, c. 1895 BC). (35-38) I sent word to our daughter-in-law: Sell 500 or 600 units of barley and let them buy [...].⁵⁴

According to this text, Pušu-ken sent a total of 3 minas 27 shekels of silver and 26 shekels of gold to his wife. 1 mina of silver and 18 shekels of gold were in the form of jewellery for their daughter, and an amount of 15 shekels of silver was meant for the

purchase of wood. Not all of this silver was to be consumed; ½ mina of silver was for the repayment of a debt to a former eponym.

But the flow of money during a merchant's lifetime could theoretically also be made visible by the volume of outstanding claims and references to transports of silver and gold to Assur – if all the documentation had been preserved, which was never the case. Tablets with transcripts of several debt-notes, called *Sammelmemoranda*, provide some insight into the volume of trade and the length of time some debts were running (DERCKSEN 2014, 92-93). The archive partly published in AKT 7A, for instance, contained several such memoranda; AKT 7A, 213 lists in all 319 minas 26 ⅓ shekels of silver; and AKT 7A, 233 is about 430 minas 10 shekels of silver and 2 minas of gold. Among the debts yet to be collected in the last text is one of 120 minas of silver (lines 1-2). The quantities of silver sent to Assur vary per transport, but amounts of 60 minas were not exceptional (60 minas of silver in VS 26, 13:5; 74 minas of silver and 12 minas of gold in CCT 5, 2a).⁵⁵ In an attempt to quantify the

54 TC 1, 30: 3-38: (3) ... la li-bi (4) dingir-ma a-šī-ti me-ta-at (...) (7) 1 li-im 3 me-at še-um i-na (8) ha-ri-a-tim ša-pī-ik er-ba-ma (9) i-na ba-a-bi u a-pā-tim (10) šī-pā-sū id-a 1 ma-na kù-babbar (11) ša-wi-ru ša šū-ha-ar-tim (12) 18 gín kù-gi a-nu-qú-ša (13) 2 mi-iš-sú hi-du u tū-dī-na-ti[m] ša (14) 1 ma-na kù-babbar ni-is-ha-sū diri (15) šu-ma-a a-hu ir-bi-šim (16) ub-lā-šī-im 2 gín kù-babbar zu-pā (17) [du]mu puzur-ištar 1 ma-na 10 gín (18) ma-nu-um-ba-lum-a-šur (19) u šu-mi-a-bi-a 3 gín kù-ki (20) dumu er-ra-a 1 gín kù-gi (21) en-um-a-šur dumu šu-a-šur (22) 4 gín kù-gi i-lu i-na tu-pī-im (23) kà-an-ku kà-as-lu-[um] (24) 5 gín kù-babbar hu-ra-ša-num (25) 15 gín kù-babbar a-na e-šī 5 gín (26) še-bu-ul-ta-ša a-šur-dug (...) (32) ... ša-ba kù-babbar a-nim (33) ½ ma-na kù-babbar a-na li-mi-im (34) ša ib-ni-šim i-lā-ak (35) a-na kà-li-ti-ni aš-pu-ra-am (36) um-ma a-na-ku-ma še-am (37) 5 me-at u 6 me-at <še>-um (38) dī-ni-ma [x x hi]-a [li]-iš-ú-mu-nim.

55 For an overview of the data on shipments of silver and gold within Anatolia and those sent to Assur and the purchases made in Assur all belonging to the merchant Elamma, see VEENHOF 2017a, 79-83, where Veenhof concludes that the total amount sent to Assur was 6-7 talents of silver over "not too many" years.

Old Assyrian trade, LARSEN (2015, 190) calculated that during the well-documented period at least 600 kg (*ca.* 1,200 minas) of silver was sent to Assur every year.

2.2.1 Money circulating among Anatolians

Details about the use of money among the Anatolian population stem from Assyrian documents referring to Anatolians receiving wages, acting as debtors, or (rarely), business partners, as well as from loan contracts and legal texts drawn up on behalf of an Anatolian creditor or buyer of property and slaves.⁵⁶ These cases demonstrate that money in the form of copper or silver, or even gold, circulated among Anatolians, but it is uncertain whether ordinary inhabitants of Kanesh had much use for money. They lived from the produce of their land and will have used their crops, if sufficient, to pay taxes and for other goods. Any money could, in principle, have been spent on goods that were useful: cattle or tools. There was no use in merely keeping money in any considerable quantity. This is illustrated by the brotherhood contracts from Level Ib, in which adult men were adopted by childless elderly couples to ensure their care when they grew old (VEENHOF 1998). The contracts oblige the “brothers” to work for the benefit of the household (*ana bētim ištēn ukaššū*), but rarely contain a mention to silver or copper as money, apart from fines valued in silver. What these contracts list are the goods that those wishing to leave the household may take with them; Kt 89/k 369 lists among the possessions of the household oxen, sheep, wool, oil, bronze tools (knives, ladles, axes) and a bronze cauldron, female slaves and textiles and saddle-cloths; the wives of the “brothers” are entitled to their dowry (*idinnum*).

But silver occurs in some inheritance clauses. The Level Ib adoption record Kt 99/k 138 (DONBAZ 2004) states that after the death of the parents, the father’s natural child will receive ½ mina of silver after which the house and all therein will be equally divided between all children. An unpublished text from Level II, Kt f/k 96, mentions 18 shekels of silver as a share in the inheritance. Also in these documents, it remains unclear whether silver was handed over, or whether goods to the value of that amount of silver are meant.

The availability of money in Kanesh is understood in punishment clauses of contracts, where it is said that the person breaking the agreement will be sold (as a slave); the place to buy slaves in Kanesh was the market (*maḥīrum*), and among potential buyers were foreign merchants (HECKER 1997, 167).

Going through Assyrian archival records gives the impression that many of the local leaders were eager to buy textiles and other expensive imported goods (iron, lapis lazuli), but usually were slow in paying for these, leading in extreme cases to the As-

syrian authorities imposing a commercial boycott.⁵⁷ The Assyrian claims were recorded on a special document called an *išurtum* (VEENHOF 1995b). These claims were valued in copper and grain, but rarely in silver, which indicates the level of access to silver these persons had.

A fine example of this is the case of an Anatolian called Ḫuḫarimataku who expected to rise considerably on the social ladder as his king had offered him two functions, and who happened to be the friend of an Assyrian merchant by the name of Innaya. He is going to participate in the *sikkātum* soon and desires to ride there on a fitting mount, a *perdum* (perhaps a mule). These animals were very expensive and therefore a symbol of high status. Assyrians were able to procure these animals from another country in Anatolia. According to one letter, Ḫuḫarimataku asks Innaya to sell him a *perdum* (published and discussed in VEENHOF 1989). He has 4 minas of *tirum* silver, while expecting the *perdum* to cost 2 minas, but he is willing to pay 3 minas. However, he is unable to pay silver in cash and proposes to send textiles, sheep and wool as payment. If Innaya disagrees, servants of Ḫuḫarimataku could sell these items for silver at the place where Innaya is staying and pay him the silver. This letter demonstrates that Ḫuḫarimataku does not possess sufficient silver, and his wealth is based on sheep, *i. e.* the animals themselves and the wool and garments (possibly *pirikannus*) made from it. While he has sheep and wool, other Anatolians have access to grain and prefer to use that as a means of (indirect) exchange. At the same time, it nevertheless demonstrates that mechanisms existed to convert the finished product into ‘metal’ cash.

Another mode of payment is described in Kt a/k 488 (DERCKSEN 1996, 167): An Assyrian writes to the *alahhinum* of Ninašša that he has sent him some expensive items at his request. The merchant gets paid as follows: his colleague has been credited on his *išurtum* in Ninašša (*ana išurtišu uṭaḥḥi*) and he has taken the price of the goods ‘here’ out of his colleague’s “silver”. He now asks the *alahhinum* to give the colleague his silver there. It appears that by doing so, the claim recorded on the *išurtum* will be settled.

The ruler of a town called Tešama owed an Assyrian merchant the following: “6 minas 3 shekels of silver mentioned in his debt-note; I clothed him and his wife in two fine garments; he promised me 1 pot (about 30 l) for a spoon; 15 sacks of grain (about 1,800 l); 10 fine *šuppum* sheep; 2 pots of Šatea. All this outstanding debt of the king of Tešama.”⁵⁸ We may expect that the first amount repre-

57 The House of the *alahhinim* has to pay the silver they owe, but until that happens nobody is allowed to sell them merchandise, Kt a/k 606b (DERCKSEN 1996, 167). See also AKT 8, 266 and the commentary in VEENHOF 2017a, 380.

58 RHA 66 Ashm. 1933.1053: (13) 6 ma-na 3 gín kù-babbar (14) ša i-šú-ur-ti-šu (15) 2 tūg sig, a-ša-sú u šu-a-ti (16) ú-lá-bi-iš 1 dug (17) a-na it-qú-ri-im (18) iq-bi-am 15 na-ru-uq (19) ú-tū-tum 10 šú-pu sig, (20) 2 dug ša ša-té-a (21) mi-ma a-nim iš-ti (22) té-šī-ma-i-im ru-ba-im.

56 For Anatolian archives, see the overview in MICHEL 2011.

sents the silver value of the claim; the second post is not given a value (would be about 1 mina of silver).

2.2.2 Anatolian creditors and debtors

It has already been noticed that Anatolian customers of Assyrian merchants who belonged to the local elite often accumulated debts (see the list in VEENHOF 2008a, 220-224). There are many debt-notes involving ordinary Anatolians, usually husband and wife, sometimes with their children or village (SHI 2015), and their local creditors. Typically in Anatolian debt-notes is that silver is never qualified as refined (*šarrupum*). Due dates are normally expressed in terms of religious festivals or agricultural events (VEENHOF 2008a, 234-245).

I will start the discussion of Anatolian debt-notes with the dossier about the female creditor Madawada, probably married to an Assyrian merchant. The Kt o/k texts of Madawada were published in ALBAYRAK 1998 (Tab. 4).

The debtors are often husband and wife, and both are fully responsible for repayment and liable with regard to all their possessions. The only time refined silver is mentioned is in a debt with an Assyrian as debtor. All debts of Anatolians in this dossier are due at harvest (*šibit niggallim*) or early autumn (*ḥarpū*), that is, after the debtors had obtained grain and grapes to repay in kind or to sell it first for silver (see the discussion in VEENHOF 2008a, 243-244). Although the due dates for silver usually fall after the grain harvest and grape harvest, there are a few exceptions, for example in the dossier of Šarabunuwa edited in AKT 10: at the melting of snow (no. 2) and in spring (no. 3, 4, 11). This does not correspond to the agricultural year, but rather to the reopening of trade routes allowing silver to reach the market.

Some debts are exclusively valued in either silver or in grain, others in silver and grain, such as ICK 1, 13. These “mixed” loans were discussed by VEENHOF (1978, 285-288) who concluded that in some of these “silver (and) grain” may denote alternatives, allowing the price of the grain to be calculated. Grain is charged as interest on loans in silver by various Anatolian and Assyrian creditors.⁵⁹

59 Kt 91/k 128B (VEENHOF 2017b, 670 no. 4): debt of 15 shekels of silver owed by Taliunan, Peruwahšu and Naki-alka, creditor Talwana; “they will add 6 sacks of barley per year”. Kt 92/k 168 (VEENHOF 2017b, 669 no. 3): debt of 15 shekels of silver owed by Barimea, his wife Kunanili and his son Ašead, creditor Išpunuman; “at autumn they will give the silver, 1 sack of barley, 2 pots of wheat and 2 pots of malt”. Kt c/k 1440 (ÇAYIR/ALBAYRAK 2018, 3 no. 1): debt of 12 shekels of silver and 3 sacks of wheat, its interest, owed by Kabitaḥšu, Perwa and Iatalka, creditor Ana. Implied in Kt c/k 1362 (ÇAYIR/ALBAYRAK 2018, 7 no. 4): debt of 1 mina of good *litum* silver, 10 sacks of wheat and 10 sacks of barley owed by Kuzuruba and Kammaliya, creditor Ḥanu; “at autumn they will pay the silver and its interest”. Also in the Level Ib text Kt 77/k 136 (GÜNBATTI 2014, 139-140 no. 11): debt of 15 shekels of silver owed by Bulina, his wife Lamassi and their son Hali, creditor Abu-šalim, (7) 5 *na-ru-uq še-am* (8) *št-ba-at kù-babbar* “5 sacks of barley is the interest of the silver”.

Text	Debt	Due date	Debtors
Kt o/k 40	1 mina of silver, 30 sacks (barley/wheat), 60 breads	grain: harvest; silver: autumn	Tamuria, Talia and his wife Iatalka
Kt o/k 44	22 ½ shekels of silver	silver: autumn	Lulu and Kammaliya
Kt o/k 46	[x] silver, 4 ½ sacks of barley	silver and barley: autumn	Aba
Kt o/k 64	4 minas of silver, 20 sacks (barley/wheat)	autumn	Kubidaḥšu and his wife Azulša
Kt o/k 81**	6 ¾ sacks (barley/wheat)	autumn	Perua
Kt o/k 106	10 ½ shekels of silver, 2 sacks of <i>qistum</i>	festival of Parka	Šarnikan and his wife Ḥašušra
CCT 1, 9b	1 mina 46 shekels of refined silver	30 shekels upon arrival in Puruḥattum, rest in 7 months	Imlikaya

** Co-creditor is Iddin-Aššur.

The debt-notes rarely record the time when the debt began; in the case of grain loans, this presumably happened in many cases when the debtors experienced a shortage in grain. It is not known whether the silver loans mean that the debtor actually obtained real silver or whether the silver represents the silver value of the grain received; in the latter case, he had to borrow it when its price in silver was high. By stating the silver value of the grain received as a loan in the contract, the creditor was assured of receiving more grain back since grain would be cheaper in silver after harvest. As such, part of the interest on the loan was built into its principal. A debt-note in the archive of Peruwa explicitly mentions the possibility of repaying a debt valued in silver with barley.⁶⁰ Debt-note Kt 91/k 518 (VEENHOF 2017b, 674 no. 7) mentions a debt in silver and the grain could be interpreted as the amount of interest to be added, or, as Veenhof did, as an alternative to payment in silver; if the debtors repay silver, they have to use the Assyrian creditor’s weight stone, a very rare expression to find with Anatolian creditors and likely inspired by the common sentence that the creditor’s pot (*karpatum*) has to be used.

The archive of Peruwa (ALBAYRAK 2005; GÜNBATTI 2016; ÇAYIR/ALBAYRAK 2018) is important for understanding the financial situation of a wealthy Anatolian in Kanesh. The house in which his tablets were excavated is with its estimated surface area of at least 224 m² and 14 rooms (ground floor) the largest complex in the Lower Town of the Level II period (HERTEL 2014, 50 no. 102). Peruwa was Chief Shepherd (*rabi rēē*) in Kanesh, but the texts lack any details about what this function entailed. Instead, they show him extending loans of barley and silver to many local families, including some Assyrian, and purchasing land (perhaps after insolvency of the debtor).

▲ Tab. 4. The claims of Madawada.

60 AKT 10, 32A: (13) *šu-ma še-am i-du-nu* (14) *ki-ma i-za-zu : i-na* (15) *ni-kà-st-šu : i-kù-babbar* (16) *i-ša-he-er* “If they want to give barley it will be deducted from the silver (value) when settling his accounts according to its exchange rate” (debt of 45 shekels of silver).

Like some other wealthy Anatolians acting as moneylenders, with the “house of the Anatolian” (*bēt nuāim*) as the local equivalent of the “house of the merchant” (*bēt tamkārīm*) in Assur,⁶¹ Peruwa loaned silver to Assyrians and he treated them like Anatolians by making their wives co-debtors.⁶² Another peculiarity is that Peruwa often stipulated repayment in instalments over several years.⁶³

There was some form of state involvement in the circulation of money in Kanesh. The expression “silver *litus* of Kanesh” points to silver in a form typical of Kanesh, although the degree of royal influence must remain unclear. Royal intervention in Kanesh concerns the abolishment of debts; two documents from the archive of Peruwa explicitly state that if the king cancels all debt, these particular debts will not be subject to that measure.⁶⁴

2.3 “Borrowing costs money”: Interest and additional payments with Assyrian and Anatolian debts

Assyrian merchants charged interest on real loans and on credit sales (VEENHOF 2017c; ZACCAGNINI 2020). The default interest on credit sales amounted to 30 % per year and was referred to as *kīma awāt kārīm* “according to the rule of the Colony” (DERCKSEN 2014, 95). Despite this official rate, other rates were charged. Even the Office of the Colony was charged interest over money that it borrowed from its merchants (15 % and 20 % charged by Enlil-bani; DERCKSEN 2004, 109) and it paid 20 % interest over the withdrawal fee (DERCKSEN 2004, 213).

According to the law stele in Assur, a guarantor who borrowed money to meet his obligation (and thus had to pay interest at the moneylender’s office) was allowed to charge his debtor an additional price, the *šibat šibtīm* (VEENHOF 1995a, 1722-1724) which literally means “interest of interest” and is often rendered as ‘compound interest’ in translations, which may be confusing. The City Hall (*bēt ālim*, *bēt limmim*) in Assur also charged interest from merchants indebted to this institution. In debts to former year-eponyms a rate of 10 % is used (DERCKSEN 2004, 46-47, 60).

61 CUSAS 34, 30 mentions a loan of ½ mina of silver and 3 sacks of wheat against interest, taken at the house of an Anatolian. According to AKT 2, 53, the Assyrian Mannu-ki-Aššur writes to Azuwa: “If Šumma-abiya refuses to give (the silver), you should say: I will take it at the house of an Anatolian at interest”.

62 AKT 10, 27: 2 minas of Kanesh silver to Pilaḥ-Ištar and Šu-Ištar and their wives; AKT 10, 29: 3 ½ minas to Alaḥum, his wife Ilališkan and his mother Ennum-Ištar.

63 Examples: AKT 10, 18: debt 70 shekels of silver, debtor “gives” each year 12 shekels; 20: debt 31 ½ shekels, Assyrian debtor pays 10 ½ shekels per year.

64 AKT 10, 22A: (22) *šu-ma ru-ba-um* (23) *ḥu-bu-lam i-ma-si* (24) *a-ta ú-ti-ti ta-da-nam* “(Even) if the king washes off the debt, you shall give me my grain”; AKT 10, 31A: (17) *šu-ma ḥu-bu-lam* (18) *i-ma-si-ú* (19) *ú šu-nu* (21) *ḥu-bu-lá-áš-nu* (21) *lá i-ma-si-ú* “If they wash off the debt(s) then they will not wash off their debt.” BALKAN (1974, 37) mentions a third attestation in broken context in Kt c/k 164: (5’) *[š]u-ma ru-b[a-um ḥu-bu-lam]* (6) *i-ma-s[...]* (rest broken).

Within the variety of forms and rates of interest charged by Assyrian and Anatolian creditors to Anatolians (GARELLI 1963, 384-385, 389-390), there is also one that could be used as a standard – but apparently only by Assyrians and those affiliated with them. This is the rate *kīma awāt Kaneš* “according to the rule of Kanesh”, which is attested in several debt-notes, with grain as object of the loan (Kt c/k 181; TC 3, 239), silver (Kt n/k 1716), and silver and grain (ICK 1, 13).⁶⁵ The key text is ICK 1, 13, from which the pertinent lines read in translation:

“(5-7) Happuala, the queen’s shepherd, owes me 12 ½ minas of silver and/or 100 sacks (12,000 l) of barley. (8-9) I possess his certified tablet bearing his sealings. (10-12) Since four years it runs at his cost at interest according to the decree of Kanesh. (12-19) My fathers, my lords are you! make him give the silver, the capital, and/or the grain as well as you can and charge him with the silver as interest and/or the grain as interest, and he should give it annually. (20) My fathers, my lords are you! (21-23) Take care to take the silver of my fixed amount and/or the grain of my fixed amount, (24-26) and draw up an *išurtum*-document for him for the interest on the silver and/or the interest on the grain.”⁶⁶

This phrase resembles the Assyrian Colony decree, which applies to silver loans but is not used for barley. Moreover, it would be presumptuous for the Assyrians to use “Kanesh” for a measure taken by their Colony in Kanesh. The rule of Kanesh is then more likely a measure taken by the rulers of Kanesh and valid in their realm, already existing or possibly taken after the example of the Assyrian Colony decree, but not necessarily at the same rate.

One of the debt-notes in which Madawada figures as the creditor (Kt o/k 64) stipulates the payment of interest in a peculiar way: the original debt amounts to 3 minas of silver. There will be an interest of 50 % on two-thirds of this sum, resulting in 3 minas. The interest on the remaining

65 Kt c/k 181 (unp. Ankara): (10) *šumma lā imdud* (11) *ki-ma a-wa-at* (12) *kā-ni-eš šī-ib-tām* (13) *ú-sú-bu* (creditor Walawala); Kt n/k 1716 tablet (ÇEÇEN 1998, 120): (11) ... *šum-ma* (12) *lā išqulū ki-ma* (13) *a-wa-at kā-ni-iš* (14) *šī-ib-tām ú-sú-bu* (creditors Buzazu and Mannu-ki-Aššur, debtors Bulina and his wife Walawala); TC 3, 239: (10) *ki-ma a-wa-at kā-ni-iš* (11) *šī-ib-tām tú-ša-áb* (creditor Aššur-nada, debtor Nini).

66 ICK 1, 13: (5) *12 ½ ma-na kù-babbar ú 1 me-at na-ru-ug* (6) *še-am ḥa-pu-a-lá re-i-um* (7) *ša ru-ba-tim ḥa-bu-lam* (8) *tup-pu-šu ḥa-ar-ma-am* (9) *ša ku-nu-ki-šu ú-kà-al* (10) *iš-tù mu-4-še ki-ma a-wa-at* (11) *kā-ni-iš a-na šī-ib-tim* (12) *i-lá-ak-šu-um a-ba-ú-a* (13) *be-lu-a a-tù-nu ma-lá* (14) *ta-le-e-a-ni kù-babbar* (15) *šī-im-tām ú ú-tá-tām* (16) *ša-dí-na-šu-ma kù-babbar šī-ib-tām* (17) *ú ú-tá-tām šī-ib-tām* (18) *i-li-bi-šu id-a-ma* (19) *ša-ti-ša-ma li-ta-dí-in* (20) *a-ba-ú-a be-lu-a a-tù-nu* (21) *iḥ-da-ma ki-ma lá-qá-a* (22) *kù-babbar šī-im-ti-a ú ú-tá-tim* (23) *šī-im-ti-a ep-ša-ma* (24) *ú a-na šī-ba-at kù-babbar* (25) *ú šī-ba-at ú-ti-tim* (26) *i-šú-ur-tù-šu eš-na*. Note that the amounts of silver and grain can be regarded as alternatives or even as equivalents of each other (VEENHOF 1978, 287).

1 mina consists of 10 sacks of barley, 10 sacks of wheat, 1 fattened ox and 60 loaves of bread. The total is then given as 4 minas of silver and 20 sacks, half barley, half wheat. The background to this arrangement is not known. The occasional addition of grain (see above), bread and animals as interest is typical of Anatolian debt-notes, and even footwear can be demanded.⁶⁷

2.4 Money uses in Kanesh and other towns in Anatolia

Money occurs in the Assyrian trade as a means of (indirect) exchange (copper, silver, gold) which can be shipped to Assur (silver and gold). It is also a means of payment: wages and rent are paid in silver or copper; inns are paid in copper, tin or silver; local and Assyrian taxes are paid in copper and silver; and silver is deposited as part of the *dātum* contributions. Money functions as a means of deferred payment with debts of silver, copper, or gold; silver and gold, but also copper and barley as inheritances; the final half of the attorney's wages is paid in silver; and when the palace of Kanesh pays copper to the Office of the Colony and merchants borrow silver to the latter. Finally, money is used as a standard of value (silver).

Money used by Anatolians functions as a means of deferred payment in debts (silver, barley and wheat) and inheritances (silver). It is a means of (indirect) exchange (silver, copper, barley and wheat) and a standard of value in contracts (prices and penalties expressed in silver).

3 Money in Assur

3.1 Money in commercial and domestic contexts

The city of Assur on the western bank of the river Tigris in North Iraq was the hometown of the traders who operated in Central Anatolia. Caravans from the south brought high-quality textiles while other caravans brought tin, presumably from the city of Susa in West Iran, which acted as a transit place. The Old Assyrian texts lack any detail about the identity of these foreign merchants, how they sold their wares in Assur and in what form they were paid. All that is known is that these foreign caravans occasionally suffered from disruptions due to political unrest. The state of knowledge about the Assyrian role is much better. Many texts excavated in Kanesh contain information about shipments of silver and gold to Assur: transport contracts and memoranda, notifying messages addressed to the representatives in Assur. In Assur these metals were primarily used to purchase merchandise – the tin and textiles and some other coveted goods such as carnelian, lapis lazuli and iron. Dozens of caravan accounts have been found which were written by the representatives in Assur who received the silver and

gold and subsequently made the purchases of merchandise and caravan equipment; the aim of those letters was to inform the sender of the money of the safe arrival and how it had been spent, ending with information about the person bringing the merchandise just bought to Kanesh. As an example of such a letter I quote from AKT 6D, 773 (lines 3-17):

“Of the 30 minas of silver that B. brought to A.'s house: additions 42 ½ shekels (and) 20 shekels. Four talents less 5 minas of tin at 17 to 1, its price in silver was 17 minas 21 ½ shekels. One hundred *kutānum* textiles including those for wrapping cost 8 minas 38 shekels. Five black donkeys cost 1 mina 33 ½ shekels. The export duty was 15 shekels. 14 shekels for harness and fodder for the donkeys. 3 shekels: of the *sa'utum* fund. We gave 31 shekels as the working capital of Ḫani to him.”

The procedure followed seems straightforward: after the shipment of silver had been brought into the house of the merchant's main banker, an excise (called *nishātum*) was levied there and purchases were made. If any gold had been sent, it was first exchanged for silver. The letters either state the rate of exchange followed by *kasapšu* (kù-(babbar)-bi) “its silver” and the amount of silver, or a form of the verb “to give” is used, which demonstrates that the gold had been sold. See, for example, this passage: “Ela brought 17 minas of silver and 2 minas of gold. From this, we sold 1 ½ minas of gold at a rate of 8 ¼ shekels of silver per shekel of gold; its value in silver is 12 minas 22 ½ shekels. Half a mina of *kuburšinnum* gold: at 6 ⅔ shekels each, its value in silver is 3 ⅓ minas. The total of your silver and your gold is 32 minas 42 ½ shekels.”⁶⁸ The person or institution buying this gold is never mentioned in these letters, but from other evidence it is known that the City Hall assessed the quality of gold and also bought it.⁶⁹

The prices for the goods and services bought in Assur are normally expressed in silver. This has been interpreted as meaning that only silver could be used to make the purchases, whereas gold was not to be used for commercial purposes but was bought by the city authorities. The silver would be a means of (indirect) exchange for the foreign traders.

Now there is some evidence that is at odds with this. The conversion of the gold is not mentioned in CCT 2, 32a: “To Ili-šadu, Anina, Aḫaḫa and Asanum, from Buzazu. 1 mina 35 shekels of gold,

68 TC 3, 2: (4) 17 ma-na kù-babbar ú 2 ma-na (5) kù-gi e-lá ub-lam šà-ba (6) 1 ½ ma-na kù-gi 8 ¼ gín-ta ni-dí-in (7) kù-bi 12 ½ ma-na 2 ½ gín (8) ½ ma-na kù-gi ku-bu-ur-šī-num (9) 6 ⅔ gín-ta kù-bi 3 ⅓ ma-na (10) šunigin kù-babbar-pí-kà lu ša kù-gi-šī-kà (11) 32 ⅔ ma-na 2 ½ gín.

69 Kt 92/k 347 (EROL 2019, 786): (4) kù-gi ša a-ni-iš-a-ni (5) li-ma-am (6) nu-kà-li-im-ma (7) 4 gín-ta ú-kà-lu (8) kù-gi ni-da-an-ma (9) šī-ma-am (10) ni-ša-am-ma (11) a-ta-bi-a-ma (12) a-ta-lá-kam (13) hu-up-šum (14) ma-ma-an ša kù-gi (15) i-lá-qé-ú (16) lá i-ba-šī “We showed the gold that I brought to the eponym and they are offering a rate of 4 to 1; we will sell the gold and make purchases and then I will prepare to leave. There is not any *hupšum* (a class of people) who takes gold.”

67 Kt c/k 1635 (ALBAYRAK 2005, 100): debt of 2 minas of silver, each year 13 shekels and a pair of shoes worth ¾ shekel.

its excise added, satisfied with his transport fee, and another half mina of gold, excise added, satisfied with the transport fee, of my votive offering, all this Asanum is bringing to you under my seal. For the 1 mina 35 shekels of gold buy me 50 textiles of ordinary quality, and for a value of 1 mina of silver white *lubūšum* cloths and a good thin textile; for the rest of the gold buy me good *kutānum* textiles. For the gold of my votive offerings buy me tin and transport my wares with Asanum.” The gold may have been exchanged nevertheless and the amounts of gold then denote their equivalents in silver. That real silver was (indirectly) used in these transactions is evident from unsystematic references to the refining of the incoming silver.

A few texts describe how, not silver, but copper was used to buy some of the goods. According to KTS 2, 36+Bursa 3776, the *kutānum* textiles, the bags, donkey harness and the *sa’udum* fund were all paid for with copper, although silver was available. Another text, VS 26, 21, tells us that 15 *kutānum* textiles were bought with copper and that even the export-tax was paid in copper. Similarly, the price of textiles is expressed in copper in CCT 1, 39b: (1) 34 tūg-ḫi-a (2) *ša še-ep iš-me-sū-en* (3) *ša a-na a-šūr-ma-lik* (4) *ub-lu 6 gú 4 ma-na* (5) *urudu it-bu-lu* “The 34 textiles transported by Išme-Suen which he brought to Aššur-malik cost 6 talents 4 minas of copper.” Such payments in copper may result from the willingness of some sellers to accept copper as payment, whereas others would insist on the use of silver. But I do not exclude the possibility that in some of the instances the “silver” used to indicate the price of merchandise and services was in fact the silver value of copper that was actually handed over. This presupposes an exchange of the silver and gold into copper. The possibility of such a transaction is documented in Kt a/k 913, according to which the representatives of a merchant brought 20 minas of silver, “half of good quality (*dammūqu*) and half checked (*ammurum*)”, into the City Hall to buy good quality copper (DERCKSEN 2004, 37). This passage informs us that copper could be and was purchased at the City Hall; such purchases happened because some payments preferably were made with copper and not with silver.

Silver or copper were also borrowed from money-lenders to purchase merchandise ahead of the arrival of money from Kanesh, to fulfil obligations as a guarantor (see 2.3), and for other purposes. The amounts of silver borrowed at the “house of a merchant” could be as high as 13 minas (AKT 7A, 88), 16 minas (AKT 9A, 61) or even 30 minas (AKT 8, 27).

The City Hall played a prominent role in Assur’s economy (DERCKSEN 2004, 14-25). It was the place where not only goods were bought for the export trade, but also copper and barley. Moreover, the gold arriving from Kanesh was assessed and bought there. Debts towards the City Hall are usually expressed as financial obligations to the eponym who presided over this institution at the

time the debt arose. Payments normally were expressed and made in silver; the same applies also to fines (*arnum*) imposed by the city (e.g. in AKT 6C, 690:14). The export tax ($\frac{1}{20}$ of the silver value of a caravan) was paid in silver to the City Hall, but payment in copper is also attested.

Female relatives possessed rings, bracelets, and toggle pins of silver and gold, some of which they had received as part of their dowries and some from their husbands and brothers staying in Kanesh (see n. 54 above). These objects functioned as money when silver was lacking but debts had to be paid or food and wool had to be purchased.⁷⁰

The few cases in which goods relative to the export trade with Anatolia were paid with copper have been mentioned above. I now want to look at the use of copper in Assur for domestic payments. In some cases, the copper was used to purchase land (TC 3, 173, see n. 74 below) or houses.⁷¹ The small dossier of letters sent from Assur by Iliya and Laqep to Iddin-Ištar contains a reference to the purchase of a house for 4 talents of copper; 3 talents were obtained by selling barley and some commercial assets, while 1 talent was borrowed at 20 % interest (Athenaeum 47; KTH 9). Iddin-Ištar’s representatives in another instance sold copper he had left with them to buy barley, see BIN 4, 95: (3) ... *urudu zi-ir* (4) *ša té-zi-bu i-na* (5) *kù-babbar-pí-kà ša a-na-kam* (6) *ni-il₃-qé 1 me-at 60 baneš* (7) *še-am ni-iš-am* “We took the copper scrap that you left behind from your silver that is here (and) we bought 160 pots (= 4,800 l) of barley”. The same purchase is related in JCS 41 (1989) text 3: (14) *urudu zi-ir 2/3 ma-na-ta* (15) *ù urudu ša té-zi-bu* (16) *ni-dí-in-ma* *še-am* (17) *ni-iš-a-ma-kum* “We sold the copper scrap at a rate of 40 and the copper you left behind and bought barley for you”. The intended purchase of barley is referred to in a letter sent by Iddin-Ištar: “You (pl.) wrote to me as follows: Now is the season (to buy grain)! Send 12 shekels of silver for the storeroom. Puzur-Aššur son of Irišum brought you 2 shekels of silver, Ili-bani son of Amur-Aššur brought you 5 minas of copper, our Amur-Ištar brought you 3 $\frac{1}{3}$ minas, Iddin-Suen son of Daya brought you 2 minas, in all they brought you 10 $\frac{1}{3}$ minas of copper and 2 shekels of silver, its excise added.”⁷² The passage from BIN 4, 95 contains the

70 Kt c/k 43: (35) ... *mi-nam* (36) *té-zi-ba-am-ma lá i-na é bé-tim* (37) *e-ri-im té-zi-ba-ni* (38) *i-na pí-im ù li-ša-nim* (39) *ta-li-ik-ma a-ni-qí-a* (40) *ta-ta-ba-al ù a-ni a-na* (41) *li-mi-im ša-wi-ri-a dš-ta-qal* (42) *tù-dí-ti a-na ší-pá-tim* (43) *a-tí-dí-ma* “What did you leave to me, did you not leave me in an empty house? You walked around with slanderous gossip and took away my bracelets. Now, I just paid my rings to the eponym. I sold my toggle pin for wool.”

71 Houses in Assur were often bought with silver, see VEENHOFF 2011. TC 2, 14 mentions how 30 minas of copper were added as interest to 6 talents of copper “of the price of Abum-il’s house” and a rate of 90 is mentioned.

72 ATHE 65: (14) *ta-dš-pu-ra-nim um-ma a-tù-nu-ma* (15) *ša-tum ša’-na-at* (16) 12 gín *kù-babbar a-na ḫu-ur-ší-im* (17) *šé-bí₄-lam 2 gín kù-babbar* (18) *puzur₄-a-šūr dumu i-ri-ší-im* (19) *ub-la-ku-nu-ti 5 ma-na urudu* (20) *i-lí-ba-ni dumu*

phrase “from your silver” (*ina kaspika*), but the context makes it clear that the commodity taken out was copper; “silver” is here used as a standard of value. This is also the case in another text where good copper to a value of 2 minas of silver is sent from Assur (RA 58 Schaeffer 2).

The sending of small amounts of copper among similar shipments of silver is noteworthy. Here it clearly was meant to be used for the purchase of food. It appears that copper was the preferred means of (indirect) exchange for barley and consignments of silver and especially those of gold are likely to have been exchanged into copper before being used.⁷³ This insight into the use of copper makes it likely that the role of that metal as a means of (indirect) exchange in Assur was considerable.⁷⁴

Although about a century older than the evidence from Kanesh, King Ilušuma's claim to have “washed the copper of the Akkadians” may well refer to the sale of goods brought to Assur by Babylonian merchants for copper – various interpretations of this statement have been suggested (see VEENHOF 2008a, 126). Note the small amounts of copper (in all 22 minas 53 shekels) listed as “outstanding claims in Assur” in TIM 7, 190 excavated in the Babylonian city Sippar. In another Sippar text dating to about 1749 BC, receipts of *šarpum* silver weighed at the City Hall in Assur are mentioned (WALKER 1980).

The consignments referred to in the lines above are listed in notifying messages, transport contracts and memoranda. Characteristically they consist of modest quantities of silver and are destined for relatives, business partners and others. Some can be regarded as gifts or support to run a

household, others have a commercial background and constitute payment for tin and textiles sold on behalf of the addressee. The last category includes not only wives and other female relatives who had sent home-woven textiles (for which see MICHEL 2016a; 2016b), but also priests and high officials, all of whom in this way derived some profit from the trade in Anatolia without having to engage personally.⁷⁵ The kings of Assur invested in the trade as well; according to AKT 2, 22, three donkeys carrying 6 talents of tin (value about 60 minas of silver) were on their way to Kanesh, and in Kt n/k 1389, a shipment of 28 minas of silver belonged to the king (EROL 2018).

3.2 Shapes and qualifications of money in Assur

The shape in which all this silver, gold and copper arrived in Assur is practically never mentioned. Ring silver (*kaspum šawirū*) seems typical for women and occurs a few times in quantities of 1 mina.⁷⁶ Its use as money is evident from CCT 3, 24: (4) *ša-wi-ru-ú ú a-nu-qú-ú* (5) *ša i-ba-ši-ú-ni ša-ši-ri* (6) *a-na a-kà-li-ki li-ib-ši-ú*, “Guard the rings and bracelets that are there! They may serve for your food.” The rare mention of rings is surprising in view of the use of silver and gold (sometimes even copper or bronze) rings or spirals (*ḥar*, the Sumerian equivalent of *šawirum*) as a gift in Ur III texts, where they have a standard weight of 5-10 shekels and most often of 8 or 10 shekels.⁷⁷ The palace archives of Old Babylonian Mari also contain many references to this object of silver or gold, where it has a weight of 1-10 shekels (ARKHIPOV 2012, 96-99). Silver and gold rings (*ḥar*) and *ḥullum* and silver *kaniktum* (of 1, 2, or 3 shekels) were distributed by King Hammurabi of Babylon to an army corps sent to his aid from Mari; some texts list the nominal and the real value (weight) of these objects (JOANNÈS 1989, 150; cf. POWELL 1978). Against the background of this wide-spread use of rings/spirals it is likely

a-mur-a-šur (21) *ub-lá-ku-nu-ti* 3 ½ ma-na (22) *a-mur-ištar ni-a-um ub-lá-ku-nu-ti* (23) 2 ma-na *i-dí-sú-en dumu da-a-a* (24) *šunigin 10 ½ ma-na urudu 2 gín kù-babbar* (26) *ni-is-ḥa-sú wa-at-ra* (27) *ub-lu-ni-ku-nu-ti*.

73 AKT 6A: (44) ... *kù-babbar* (45) 1 ma-na *ú* 2 ma-na *šé-bi-lá-nim* (46) <<šé-bi-lá-nim-ma>> *ú-tá-tám* 10 baneš *a-pá-ni-ku-nu* (47) *lu ni-iš-pu-uk* “Send at least 1 or 2 minas of silver here so that we can store 300 litres of grain before you come”. TC 3, 35: (3) ... 10 gín (4) *kù-gi ša a-na ú-tá-tám* (5) *ša-pá-ki-im tū-šé-bi-lá-ni* “The 10 shekels of gold which you sent to store grain”.

74 One of the rare documents dealing exclusively with copper in Assur is TC 3, 173: (1) [11 gú?] 30 ma-na urudu (2) [a]s-ni-iq-ma [(x)] (3) [x] *ku-nu-ki i-ba-ši* (4) 1 gú 31 ½ ma-na urudu (5) *iš-ti dūg-ši-lá-a-šur* (6) 2 gú urudu *iš-ti me-er-e* (7) *i-lí-áš-ra-ni ga-sú-ri-im* (8) *šunigin 14 gú 31 ½ ma-na* (9) urudu *ša-ba* 4 gú 51 ma-na (10) urudu *ša* 3 ma-na *kù-babbar* (11) *a-na um-ma-ti-a* (12) *i-ša-qal* (13) 2 gú 9 ½ ma-na urudu (14) *ša* 1 ½ ma-na *kù-babbar ši-im* (15) *qá-qí-ri i-ša-qal* (16) *ši-ti* urudu 4 gú 17 ma-na (17) urudu *i-ši-tám* “I checked [11 talents] 30 minas of copper and it is under seal. Ṭab-šilla-Aššur owes 1 talent 31 ½ minas of copper; the son of Ili-ašranni, the man from Gasur [the old name of Nuzi], owes 2 talents of copper. In all: 14 talents 31 ½ minas of copper. From this he will pay 4 talents 51 minas of copper, for a value of 3 minas of silver, to my mother; he will (also) pay 2 talents 9 ½ minas of copper, for a value of 1 ½ minas of silver, as the price of a plot of land. The rest of the copper, 4 talents 17 minas of copper, remains at my disposal.” For the reading of line 15, see VEENHOF 2011, 215. The exchange rate of the copper is 97.

75 See, for example, CCT 1, 15b: (16) 12 gín *a-na i-ku-nim* (17) *nu-bānda* “12 shekels for Ikunum, the *laputtāum* officer”; CCT 5, 41a: (6-12) “One bundle with 1 mina of silver proceeds of the tin of Elali, *laputtāum* officer, another bundle with 5 shekels of silver proceeds of the textile of Aššur-malik, *laputtāum* officer, 1 shekel of gold, consignment for the king; CCT 6, 27b: (3') 1 *ri-ik-sú* 15 gín *kù-babbar* (4') *ši-im tūg ša ma-nu-ba aḥ-me ša a-šur* ... (13') 1 *né-pi-šum* 15 ma-na *kù-babbar* (14') *ku-nu-ku-a ú ku-nu-uk ás-qú-dim* (15') *a-ru-ba-im* 1 *né-pi-šu-um* (16') 5 ma-na *kù ku-nu-ki-a ši-im* (17') *an-na ša a-bi-šu a-ru-ba-im* “A bundle containing 15 shekels of silver, proceeds of a textile of Mannuba, priest of Aššur ... One packet containing 15 minas of silver under my seal and the seal of Asqudum for the king. One packet containing 5 minas of silver under my seal, proceeds of his father's tin, for the king.”

76 Sadberk 24: (7) 1 ma-na *kù-babbar ša-wi-re-e* (8) *a-na tara-am-ku-bi* (9) *ú ši-ma-at-a-šur tū-bi-il*, “One mina of ring silver you brought to Taram-Kubi and Šimat-Aššur”; TC 1, 30:10-11: 1 ma-na *kù-babbar ša-wi-ru ša šú-ḥa-ar-tim* “One mina of ring silver of the girl”.

77 MICHALOWSKI 1978; POWELL 1978; PAOLETTI 2012, 139 (“Handelsform für Metalle”), 307-310.

that the silver in some of the references to 1 shekel (or multiples of it) of silver being gifted in Anatolia or sent to somebody in Assur (often) was in the form of rings.

The normal quality of silver sent from Kanesh was “refined” (*šarrupum*). This was real silver, as is evident from AKT 6A, 74 according to which an amount of 58 ½ minas of “refined silver” remained to be sent to Assur; the instruction reads: “Let him refine (*lušarrip*) the silver and check (*lusanniq*) it with the balance weights of the merchant, let him seal it and give it to you.” Before being sent from Kanesh, (most?) silver was remelted to increase its purity (the merchants obtained the metal in different forms and qualities) and subsequently cast into moulds (see §1.5 above). Caravan accounts sent from Assur often include a reference to the remelting of the silver received to fully account for the use of the silver (VEENHOF 2014), as apparently, the degree of purity could still be insufficient to be used in Assur (possibly by command of the City Hall).

3.3 Facilitating the calculation of costs for caravans

The Assyrian donkey caravans were charged a road-tax (*dātum*) based on the value of the merchandise they carried and related to distance (VEENHOF 1972, 219-244). To facilitate this calculation, the Assyrian authorities resorted to a system that had proven very effective in institutional book-keeping during the Ur III period. During the Ur III period, goods and services were given a value in a common denominator, such as silver in the so-called balanced accounts of merchants with temples in Umma or days in the calculation of available labour force and output (ENGLUND 2012). Whether or not the Assyrians were directly influenced by this bureaucratic tool is impossible to say. Donkeys and merchandise of a caravan were given a “declared value” (*awītum*) in which tin functioned as a standard of value between Assur and Kanesh and silver as a standard of value for return caravans from Kanesh to Assur (DERCKSEN 2004, 148-162). Tin was chosen because it constituted the main commodity of the caravans; 1 mina of sealed tin and hand-tin had a value of 1 mina, textiles irrespective of their quality of 2 minas each (corresponding to about usual prices in Kanesh) and donkeys (depending on their quality) between 1 ½ and 2 minas each. This simplified the calculation of the road-tax which was expressed as an amount of tin per talent of declared value, and charged to the respective owners of merchandise transported in the caravan. As an example of a document enumerating travel expenses I quote from Kt g/k 199 (GÜNBATTI 2002, 82-83):

“Buzutaya and Aššur-imitti to Ali-ahum: 2 talents 10 minas of sealed tin, 16 textiles, 20 minas of hand-tin, one donkey: Šu-Kubum brought it out (of Assur). The total of your declared value is 3 talents 4 minas.

From Assur until Ḥamisanum at 88 shekels per (talent) the road-tax amounted for you to 4 ½ minas. The remainder of your declared value: 5 talents 17 minas.

From Ḥamisanum until Šimala at 42 shekels per (talent) the road-tax amounted for you to 4 minas 35 shekels. The remainder of your declared value: 5 talents 12 minas.

From Šimala until Zalpa the road-tax amounted to 2 minas 4 ¾ shekels per (talent), (that is) 10 minas 49 shekels. Head-tax (for one person): 10 shekels; transportation of two top-packs: 6 ½ shekels.

From Assur until Qaṭṭara, from Burullum until Šimala: 39 shekels rent for a donkey; one donkey died in Ḥaḥḥum.

From Ḥaḥḥum until Zalpa: 40 shekels rent of a donkey; 20 shekels losses; 2 minas fodder; 2 minas hire of a harnesser – owed by Aššur-taklaku. The donkey is strong. If he works for him he will pay 2 minas of tin at a rate of 7. He paid 45 shekels for the price of the donkey.

We settled accounts with Šu-Kubum and after the 20 minas of his hand-tin had been spent we paid him 6 minas 45 ½ shekels out of Ili-Alum's tin. 3 ½ minas is the road-tax for half a donkey (loaded with) tin which was ... in Ḥamisanum. Your share in the lost goods is 12 minas 20 ½ shekels.

In all we paid 22 minas 36 shekels out of Ili-alum's tin. Take care to send the silver with the first opportunity.”

3.4 Gold in Assur

Gold was hoarded by the city and does not appear to have been used as a means of (direct) exchange in Assur; any reference to quantities of gold being sent for commercial or domestic purposes will mean that it was converted into silver or copper and thus functioned as a means of indirect exchange. Apart from the obvious use of gold for jewellery (beads, rings, earrings), it was also a preferred material for “sun-disks” (*šamšum*) presented to deities as a votive offering (MICHEL 2016c). In both cases, gold is here a means of storing wealth. The reluctance of some merchants to comply with their promises made to a god led in one specific instance to the merchant's wife, living in Assur, rebuking her husband and declaring “you love silver and detest your life”.⁷⁸ Gold was, however, circulating among Assyrian merchants, but its use to non-Assyrians (Akkadians, Syrians and Hurrians) was strictly forbidden according to Kt 79/k 101.⁷⁹ The reason may have been that

78 TC 1, 5: (8) kù-babbar ta-ra-am (9) na-pá-áš-ta-kà (10) ta' -zi-ar.

79 Kt 79/k 101 (SEVER 1990, 262): (1) um-ma wa-ak-lum-ma (2) a-na kà-ri-im (3) kà-ni-iš^{ki} (4) qí-bi-ma tu-pá-am (5) ša di-in a-lim^{ki} (6) ša a-šu-mi kù-gi (7) ša ni-iš-pu-ra-ku-nu-ti-ni (8) tu-pu-um šu-ut a-ku-uš (9) a-šu-mi kù-gi i-šú-ur-tám (10) ú-la né-šú-ur (11) a-wa-tum ša kù-gi (12) pá-ni-a-tum -ma (13) a-ḥu-um a-na a-ḥi-im (14) a-na ší-mi-im (15) i-da-an (16) ki-ma a-wa-at na-ru-a-im (18) dumu a-šur šu-um-šu (19) kù-gi a-na a-ki-di-im (20) a-mu-ri-im (21) ú

gold was used to pay for the import of tin in Assur (DERCKSEN 2004, 88-91; VEENHOF 2008a, 89).

Gold is used as a standard of value in the long-term joint-stock partnerships called *naruqqum* (lit. “sack”; LARSEN 1999; DERCKSEN 2004, 83-89). This important, and for the Bronze Age unique, financial instrument is imperfectly understood. It successfully functioned for some decades and was then abandoned. A joint-stock partnership was established when a junior trader had obtained sufficient trust from other merchants for them to invest in a fund managed by him. Only few copies of joint-stock partnership contracts have been found in Kanesh (the originals were kept in Assur) and they contain the same stipulations but varying terms and amounts of investments. The contract of Amur-Ištar (HECKER 1999) amounted to 30 minas of “gold” and lasted for twelve years (from REL 65); Amur-Ištar himself is booked for 4 minas. That of Elamma (AKT 8, 2) contained in all 27 minas 51 shekels of “gold” and lasted for ten years (from REL 78) and also, he contributed a share (3 minas 45 shekels; VEENHOF 2017a, 3-6). Shares in a joint-stock partnership were made with silver or with a claim expressed in silver at the rate of exchange of 4 minas of silver for 1 mina of gold – an artificial rate.⁸⁰ In return for promising not to withdraw the share before the end of the term, the shareholder received a part of the profit. If a shareholder withdrew his (or her) share prematurely, the “gold” would be returned at the initial rate of 4 to 1 and he would forfeit a share in the profits. The merchant “carrying the sack” at the end of the term had to present the accounting, but unfortunately no information has survived about this phase of the contract. An investor, or the heirs if he had died, could withdraw their share from a joint-stock partnership and sell it. Somehow at the dissolution of the contract real gold was paid out and rates of 6 ¼, 5 ½ and 5 to 1 are attested for instances where shares were sold (DERCKSEN 2004, 84-85).

The joint-stock partnerships, however, were only part of a merchant’s capital based on investments

and loans. Another form of long-term investment was called *ebuttum*. It appears from AKT 7A, 117 that silver (or rather the silver value of goods) given as an *ebuttum* could be integrated into one’s joint-stock partnership.⁸¹

At the end of the joint-stock partnership contract of Elamma his own assets are enumerated: “1500 measures of barley, 2 slaves, the share (in the inheritance) and (what is in) the various ‘pots’ – all this is my available capital.”⁸²

3.5 Money uses in Assur

Money is used in Assur as a means of payment when silver and occasionally copper are paid as export tax or as a fine; as wages to caravan personnel and in payment of debts. It is a means of (indirect) exchange when silver, copper and gold are used to purchase merchandise, caravan equipment, food, slaves, plots of land and houses. Silver is used as a standard of value in caravan accounts. Gold is a standard of value in joint-stock partnerships. In the system of declared value, tin is a means of (deferred) payment for toll and a standard of value; moreover, it is used as a means of (indirect) exchange. Barley and bronze utensils are used as a means of (indirect) exchange. Money is a store of wealth when used as an investment in joint-stock partnerships and similar financial instruments (*ebuttum*) or hoarded by the city (gold).

4 Money between Assur and Anatolia

4.1 Treaties, kings and caravans

Epigraphic data from Upper Mesopotamia demonstrate the use of silver and copper as money in that region, but cannot be analysed in this article. Data about the use of money by Assyrian merchants when travelling between Assur and Kanesh stems from records of accountability describing costs incurred during a caravan journey, letters, and treaties. The routes followed by caravans from Assur included several towns where an Assyrian colony (*kārum*) existed. The city-state of Assur concluded treaties with all rulers whose territory was crossed by Assyrian caravans or where an Assyrian trading settlement was located. These treaties listed the duties of the local ruler (mainly the protection of Assyrian life and goods) and the Assyrian commitment to pay toll and other fees and in some towns to grant the palace the right to purchase a fixed number of goods at discount-

šu-bi-ri-im (22) *ma-ma-an* (23) *la i-da-an* (24) *ša i-du-nu* (25) *ú-lá i-ba-lá-at* “The ruler (of Assur) to the Kanesh colony: The tablet with the verdict of the city, which concerns gold, which we sent to you, that tablet has been cancelled. We have not fixed any (new) rule concerning gold. The earlier rule concerning gold still prevails: Assyrians may sell gold among each other, (but) in accordance with the words of the stele, no Assyrian whatever shall give gold to any Akkadian, Amorite, or Subarean. Whoever does so shall not remain alive.”

80 Conversion of debts into a share occur in, for example, AKT 6A, 18 (20 minas of silver → share of 5 minas); AKT 6A, 22 (24 minas of silver → share of 6 minas); AKT 6A, 23 (8 minas of silver → share of 2 minas). A more complex conversion is attested in Kt c/k 672 (unp. Ankara), 1-10: “Ali-ahum has a claim on Aššur-ṭab son of Šu-Ištar of 40 minas of silver. He will pay within 3 years. When he pays this silver Ali-ahum shall invest 11 minas of gold into the joint-stock partnership of Aššur-ṭab.”

81 AKT 7A, 117: (4) *ša 30 ma-na kù-babbar* (5) *ša-ru-pá-am a-šur-sipa* (6) *a-na puzur-sa-tu* (7) *a-na e-bu-tim* (8) *i-di-nu kù-babbar* (9) *ú mi-qí-sú a-na* (10) *na-ru-qí-šu i-lá-ak* “Aššur-re’i gave 30 minas of refined silver to Puzur-šadue as an *ebuttum*. The silver and its profit goes to (Puzur-šadue)’s joint-stock partnership.”

82 AKT 8, 2: (27) *1 li-im 5 me-at še* (28) *2 sú-ub-ru-um* (29) *zi-tum lu ku-ur-sí-na-tum* (30) *mí-ma a-nim ša-al-tí*; transl. VEENHOF 2017a, 4. On *šalum*, see DERCKSEN 1999, 88-90.

	AKT 6A, 144/145	AKT 6B, 483	Kt c/k 863	Kt c/k 866
number of donkeys	34	13	11	21
hand-tin	(not quantified)	30 minas	40 minas	50 minas
(bronze) nails	600 (86 yellow)***	30 minas	520	> 1030
(bronze) sickles	--	40 minas	30 minas	--
scrap	60 minas	--	--	78 minas
silver	2 minas	3 ½ minas	1 mina	2 ½ minas
fine oil (i-sag)	15 l (<i>rēšum</i>)	--	5 l	15 l (?)
sweet oil (i-giš dūg-ga)	30 l (<i>tābum</i>)	--	5 l	15 l
saffron (<i>azapurum</i>)	60 l	--	--	30 l
(beads of) carnelian	22 shekels	--	--	--
(beads of) <i>ziqanšarrum</i>	100	--	--	--

*** See DERCKSEN 2013, 361.

▲ Tab. 5. Goods provided to selected caravans to cover travel expenses.

ed prices. It was due to these international treaties that the Assyrian trade network was able to operate. The site of Tell Leilan, ancient Šeḥna, was the capital of Apum and housed an Assyrian colony. A treaty between the king of Apum and Assur dating to the mid-18th century was excavated there and although the text is badly damaged, the payment of a tax in copper is mentioned.⁸³ Further to the west was the kingdom of a ruler with whom Assur agreed that he would levy the same toll as his late father had done according to a treaty text (Kt n/k 794) found in Kanesh (ÇEÇEN/HECKER 1995): 12 shekels of tin per donkey from a caravan travelling to Kanesh, and 1 ¼ shekels of silver per donkey from the return caravan to Assur. Also excavated in Kültepe are two treaty texts from the Level Ib period, one with a king of Kanesh and the other with the rulers of Ḫaḫḫum (Kt 00/k 10: GÜNBATTI 2004; see VEENHOF 2008a, 194-200; 2013). The three men then governing Ḫaḫḫum, a city strategically located on the Euphrates and one of the crossing points for caravans, were given the right to pre-empt textiles from upcoming caravans and gold from return caravans; the price they had to pay is expressed in silver. From caravans travelling to Kanesh, the highest-ranking officer buys at most five *kutānum* textiles at 6 ⅔ shekels of silver each, the second one two textiles at 9 ⅓ shekels of silver each, and the third one textile at 12 (amount restored) shekels. From return caravans, they can buy gold; only the price to be paid by the third officer is preserved, 6 shekels of silver per shekel of gold.

4.2 Shapes and qualifications of money between Assur and Anatolia

The documents directly emanating from the men travelling with the caravan are far more informative, and show the existence of an infrastructure for caravans consisting of resting places with inns (*bēt wabrim*) and the possibility of buying fodder or re-

placing donkeys (for such texts see NASHEF 1987; BARJAMOVIC 2011, 19-37; DERCKSEN 2015b). To pay for such expenses, goods were provided to the caravan leader in Assur, and the purchase of hand-tin has already been mentioned – it appears that the amount of hand-tin provided frequently fell short of what was actually needed (DERCKSEN 2014, 85). Instead of merely hand-tin (at least mentioned in the texts), some caravans received a more varied supply of goods (Tab. 5).

‘Nails’ (*zamrutum*) and sickles are copper or bronze objects.⁸⁴ The use of (old) sickles (*niggal-lum*) as a means of (indirect) exchange is known from Anatolia (DERCKSEN 1996, 223). The scrap (*ḫušā’u*) and sickles do not occur together in the same text which suggests that the sickles were considered a form of scrap. The scrap in Kt c/k 866:16 was broken up (*1 gú 18 ma-na ḫu-ša-ú ša-bu-ru-tù*). The ‘nails’ seem to have only been used in Upper Mesopotamia. In his analysis of metal objects mentioned in the royal archives of Mari, ARKHIPOV (2012, 129-130) argued that they should be interpreted as a weapon, which led me to suggest that the Old Assyrian evidence is about “objects of a standard weight shaped like the head of a javelin” (DERCKSEN 2013, 361).

Semi-precious stones, oil, and items of food (not listed here) figure among audience gifts to local rulers. A (probably) isolated reference to the use of carnelian as a means of (indirect) exchange in a town called Šunukam is attested in Kt c/k 441,⁸⁵ although other expenses in the same text are paid for with tin and copper. From the perspective of a local palace (Tell Leilan-Šeḥna) we have a record of the delivery of 1 l of fine oil as an audience gift by the merchant Innaya coming from Mama (VINCENTE 1992, no. 153; dating to about 1749 BC).

4.3 Money Uses

Caravans were provided with different currencies: for those heading for Anatolia, tin served as a means of payment for taxes, toll and inns, but tin could also be used as a means of (indirect) exchange. Copper, bronze and silver were used as a means of (indirect) exchange. In the system of declared value (*awitum*), the standard of value was tin for caravans to Anatolia, but silver for return caravans to Assur.

5 Concluding remarks

The outcome of the investigation into money uses in Old Assyrian and Anatolian society is summarised in this section.

84 RA 59, no. 17 (MAH 16158) reads (8) ... 3 gín an-na (9) *za-am-ru-ta-am ú sa-be-er-tám* (10) *a-na é ub-ri a-dí-in* “I gave 3 shekels of tin, (one) nail and *saḫertum* to the inn”.

85 Kt c/k 441 (DERCKSEN 2015b, 54): (6) ... 5 *sa-ma-tim* 2 *zi-qá-ša-ri* (7) *a-na e-ši i-na šu-nu-kam* “Five beads of carnelian and two of *ziqanšarrum* stone for wood in Šunukam”.

83 Publication: EIDEM 1991; 2011, 417-426; discussion: VEENHOF 2008a, 184-185; 2013. For some details about the economy of Apum, see EIDEM 2008, 331.

The money uses in Kanesh and other towns in Anatolia can be differentiated between those practised by a) Assyrian merchants (including Anatolian members of the family and household) and b) Anatolians.

a) Assyrian merchants: silver and copper were used as a means of (indirect) exchange for commodities, food, travel expenses, slaves and property. As a means of payment, copper and tin were used for tolls and for inns; copper and silver were paid for Assyrian levies; silver was paid instead of cutting up a textile to pay the levy of the palace. As a means of deferred payment, silver and to a smaller degree copper and gold, were used for debts, and silver for fines imposed by the colony. For travel expenses, the choice of metal was determined by the phase of the trade, principally whether the traveller carried tin or had already acquired copper or silver.

Silver is used as a standard of value for debts and to express the value of other goods; in the latter case the word for silver can be translated “money”. The answer to the question of whether or not silver or instead some other good (copper or grain) was used often has to remain open. The purchase of food and other household necessities frequently involved small quantities of silver (fractions of the shekel) and we do not know if such sums were really paid out or, for example, were added up and paid later, or were paid in a different currency such as copper. Copper appears to be the common means of (indirect) exchange in Kanesh and other towns in Anatolia.

b) Anatolians: evidence for the payment of taxes is lacking, but copper, grain and silver are likely currencies to have been used. Grain and silver occur as a means of deferred payment in debts, and silver as divorce money and in inheritances. The means of (indirect) exchange were copper, barley and silver; silver for slaves, land and houses in sale documents, unless it was used as a standard of value. As a standard of value, silver is used for prices and in penalty clauses in contracts.

The money uses in Assur are the following: as a means of (indirect) exchange silver and copper were used to buy merchandise and grain, but also slaves, land and houses. The City Hall received silver in exchange for trade goods, and as payment for export tax and fines, but instances of the use of copper are also known. Silver was the general standard of value. Money was a store of wealth for investors (silver) and the city (gold). The practical use of gold was restricted; it functioned as an indirect means of exchange as it was first sold for silver or copper before commodities were bought. Gold was a means of value in the Assyrian joint-stock partnerships.

The money uses in Upper Mesopotamia, as far as documented by Assyrian merchants and their caravans, are these: copper, tin and silver were used as a means of (indirect) exchange to obtain food and animals. Copper and probably also bronze were in the shape of scrap (*hušā'ū*, including sickles) and, only

used here, ‘nails’ (*zamrutum*). Occasionally, luxury items, such as semi-precious stones were used, although these isolated cases may rather represent forms of barter. It seems that semi-precious stones and oil were predominantly meant to be presented to local rulers as audience gifts. Apart from its use as a means of (indirect) exchange, tin functioned as a means of value and as a means of (deferred) payment in the Assyrian system of declared value (*awī-tum*) for caravans travelling to Anatolia, and silver fulfilled this function for the returning caravans.

Compared to contemporary Babylonian evidence, the amount of silver and gold circulating in Assur was enormous. However, silver did not drive out the use of copper as a means of (indirect) exchange in Assur.

Information on Assyrian weights and measures of volume

The basic unit of the Mesopotamian weight system used by the Assyrian merchants was the *shekel* (Akkadian: *šiqlum*, logogram: *gín*) of about 8.3 g; 60 shekels make 1 *mina* (wr. *ma-na*) of about 500 g. The highest denomination is the talent (Akkadian: *biltum*, logogram: *gú*) of 60 minas, about 30 kg.

Grain is measured (*madādum*) in pots (*karpātu*) of about 30 l, for which also the logogram *banēš* (Akkadian: *šimid*) is used; four such pots make 1 sack (*naruqqum*) of about 120 l.

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Author Guidelines

Weight & Value (as of 2021)

The following guidelines are provided as supporting material for the collaboration between authors and editors for edited volumes (proceedings).

Submission of manuscripts

All manuscripts should be submitted in digital format in English with the following elements (as relevant):

- running text (*ca.* 20 pages, including bibliography; tables and figures are not included in this page count)
- figures (*ca.* 10 figures), plates
- tables (to be submitted separately in Word files)
- captions for figures and tables (to be submitted separately in Word files)
- bibliography
- abstract, *ca.* 200-300 words (German and English)
- keywords (German and English)
- authors' names and full postal contact/affiliation details and an email address

Layout – basic information

- the text should be submitted in an MS Word file (.doc or .docx), OpenOffice file or Rich text file (.rtf)
- Times New Roman 12 pt, 1.5 line spacing, left-justified, words should not be divided by syllables, no page numbers, no paragraph formatting (*i. e.* no indentations)
- authors' names for citations in proper SMALL CAPS, *italics* for emphasis or Latin expressions, super-/subscript numbers for chemical formulas *etc.*
- in-text cross-references for own figures in brackets, *e. g.* (Fig. 12,7.10)
- dashes and hyphens: short dashes (-) to connect compound words (*e. g.* Saale-Eiszeit) and to signify "from ... to ..." (*e. g.* 50-60 m); long hyphens (–) for inserted thoughts and to signify distances (*e. g.* Göttingen–Kassel)
- headings remain unformatted; please note their hierarchy with <<HL1>>, <<HL2>>
- avoid footnotes; exceptions are, for example, acknowledgements *etc.*; when footnotes are included, they should be used as follows: if a footnote refers to a single word or group

of related words, the superscript numeral should be placed directly after the last word (*i. e.* before a potentially following punctuation mark); if the footnote refers to a complete sentence, or a part of a sentence that is enclosed by punctuation marks (*e. g.* full stop, comma or semicolon), the superscript numeral should always be placed after the last punctuation mark

Abbreviations in the text

Abbreviations in the text should, if possible, be avoided. In tables, for example, established abbreviations should be used. We would ask you to adhere to the following abbreviations (especially at sources):

app.	= appendix/appendices – exception: cross-references (App. 1)
BC, AD	= before/after Christ (no full stops)
<i>c.</i>	= cum
<i>ca.</i>	= circa
<i>cf.</i>	= confer
<i>e. g.</i>	= exempli gratia (with non-breaking space)
<i>et al.</i>	= et alii
<i>etc.</i>	= et cetera
fig.	= figure/figures – exception: cross-references (Fig. 1)
ha	= hectar/hectares (1 ha = 10,000 m ²)
<i>i. e.</i>	= id est (with non-breaking space)
<i>ibid.</i>	= ibidem
lb	= pound/pounds (1 lb ≈ 0.454 kg)
n.	= note/notes
no.	= number/numbers
pl.	= plate/plates – exception: cross-references (Pl. 1)
t	= (metric) ton/tons (1 t = 1,000 kg)
tab.	= table/tables – exception: cross-references (Tab. 1)
<i>v. v.</i>	= vice versa (with non-breaking space)
vol.	= volume/volumes

Units of measurements are also abbreviated (5.00-6.70 m; 15 %; 25 g; 12.80 m², 16,000 km²), have a space after the last digit, with the exception of "x" (5.00 m x 7.80 m) and should be used consistently (the pit is 5.00 m long, 4.70 m wide and 0.05 m deep); the measurements should be expressed with the same number of decimal places.

Fractions should be expressed as special character (*e. g.* ½ or ¼). Complex fractions (*e. g.* 7/8) could be converted by the editor 7/8. Please mark these.

Citations, references and illustration credits

Literature references should appear in the running text.

Short titles consist of authors' surnames and year of publication, page numbers, figure or table numbers (if applicable) – separated by commas:

(BÄRENFÄNGER/ZIMMERMANN 2012, 6, 17, 20, fig. 25,8, pl. 40,7, 25,3.5-8.27, 30,4.7.10-14)

If multiple authors are cited they should be separated by a semicolon, ordered by year of publication in ascending order; multiple publications of the same author in one citations only require the year of the next publication after the semicolon:

(BÄRENFÄNGER 2012, 14-17; 2014, 300, fig. 25; 2018, 25-30; MELLER 2016, 60, fig. 20,8-10, 22,9.12, pl. 20,7)

(DUNAND/ZIVIE-COCHE 1991, 117-119; ASSMANN 1994; BELL 1998, 135-137, 163-172, fig. 85,7-10.12.15-28)

Page numbers should always be given in full (MÖLLERS 1999, 506-532).

Short titles are given in full in the bibliography.

Bibliography

The bibliography should only contain publications cited in the text.

Format and punctuation should follow the examples provided below.

The bibliography should be organised in alphabetical order; multiple publications of the same author in the same year should be differentiated with lowercase letters; name affixes (van, de ...) are not included in the alphabetical order:

VAN DRIEL/VAN DRIEL-MURRAY 1979

van Driel, G., van Driel-Murray, C., *Jebel Aruda 1977-78*. *Akkadica* 12, 1979, 2-28.

RAHMSTORF 2016a

Rahmstorf, L., From 'value ascription' to coinage: A sketch of monetary developments in Western Eurasia from the Stone to the Iron Age. In: S. Krmnicek/C. Haselgrove (eds.), *The Archaeology of Money: Proceedings of the 'Archaeology of Money'*, University of Tübingen, October 2013. *Leicester Archaeological Monographs* 24 (Oxford 2016) 19-42.

RAHMSTORF 2016b

Rahmstorf, L., Die Rahmenbedingungen des bronzezeitlichen Handels in Europa und im Alten Orient einschließlich Ägyptens. In: U. Dietz/A. Jockenhövel (eds.), *50 Jahre „Prähistorische Bronzefunde“ – Bilanz und Perspektiven*. *Internationales Kolloquium*, 24. bis 26. September 2014. *Prähistorische Bronzefunde* XX, 14 (Stuttgart 2016) 291-310.

For publications with multiple authors their names are separated by: a slash without spaces in the short title (more than three authors: *et al.*); a comma in the full citation:

VRDOLJAK/STAŠO 1995

Vrdoljak, S., Stašo, F., *Bronze-casting and organization of production at Kalnik-Igrišće (Croatia)*. *Antiquity* 70, 1995, 49-91.

WANG *et al.* 2016

Wang, Q., Strekopytov, S., Roberts, B. W., Wilkin, N., *Tin ingots from a probable Bronze Age shipwreck of the coast of Salcombe, Devon: Composition and microstructure*. *Journal of Archaeological Science* 67, 2016, 80-92.

Journal titles and series are not abbreviated.

"In:" is followed by the name of the editor; multiple editors should be separated by a slash without space and marked (eds.) (or (ed.)).

Generally, care should be taken to ensure the completeness of citations (journals and line numbers).

Capitalisation rules for references in English language should follow these guidelines (compare University of Oxford Style Guide): https://www.ox.ac.uk/sites/files/oxford/media_wysiwyg/University%20of%20Oxford%20Style%20Guide.pdf

1. Sentence capitalization for all book section, article, conference paper, lecture, conference session titles
2. Headline capitalization for books, journals and book series, conferences
3. Within category 1, the following things are capitalized: broadly-recognized proper nouns: Central Asia, Middle East, North Africa – but eastern Mediterranean, northern Syrian, ancient Near East

Page ranges should be expressed entirely in numbers (*e. g.* 200-265) and not with f. or ff.

The place of publication should be given in the language of the publication; only the first place of publication should be named:

BASS 1991

Bass, G., Evidence of trade from Bronze Age shipwrecks. In: N. Gale (ed.), *Bronze Age Trade in the Mediterranean*. *Studies in Mediterranean Archaeology* 90 (Gothenburg 1991) 69-82.

BROGAN 2006

Brogan, T., Tipping the scales: Evidence for weight measurement from the wider Neopalatial community at Mochlos. In: M. Alberti/E. Ascalone/L. Peyronel (eds.), *Weights in Context: Bronze Age Weighing Systems of Eastern Mediterranean: Chronology, Typology, Material and Archaeological Contexts: Proceedings of the International Colloquium, Rome 22nd-24th November 2004*. *Studi e materiali* 13 (Rome 2006) 265-292.

RIST 2002

Rist, C., A new look at Old World money. *Discover Magazine* 23, 2002, 42.

ROBSON 2007

Robson, E., Mathematics, metrology, and professional numeracy. In: G. Leick (ed.), *The Babylonian World. The Routledge Worlds* (New York 2007) 414-427.

Unpublished master/magister thesis or PhD dissertations should be noted in brackets:

HAHNER 1984

Hahner, A., *Altenritte – eine hallstatt- und latènezeitliche Siedlung in Nordhessen. Untersuchungen zu den Befunden und Funden der Ausgrabung von 1932* (magister thesis University of Göttingen 1984).

SMITH 1999

Smith, C., *The Market Place and the Market's Place in London, c. 1660-1840* (PhD dissertation University of London 1999).

Digital media can only be cited if they have a URN of the Deutsche Bibliothek (www.ddb.de) or an alternative Persistent Identifier (*e. g.* DOI), which guarantees a persistent URL; the date when the medium was last accessed (...) should be given before the full stop:

SCHMALFUß 2007

Schmalfuß, G., *Das Gräberfeld Battaune, Kr. Delitzsch in Sachsen. Ein jungstbronzezeitliches Gräberfeld der Lausitzer Kultur – die Ergebnisse der Grabungen von 1974/75*. Leipziger online-Beiträge zur Ur- und Frühgeschichtlichen Archäologie 29, https://www.gko.uni-leipzig.de/fileadmin/user_upload/historisches_seminar/02urundfruehgeschichte/Online_Beitraege/OnlBei29.pdf (accessed 24.06.2018).

TOWELL/ATOLLINI LECÓN 2009

Towell, J. L., Atollini Lecón, A. (eds.), *Caminos y Mercados de México* (México D. F. 2009). Available online, <http://www.historicas.unam.mx/publicaciones/publicadigital/libros/caminosymercados/mercados.html> (accessed 24.06.2018).

Figures and tables

General information

Figures are all drawings, photographs, maps, plans, tables and diagrams that are included in the text.

Tables should be submitted as individually numbered Word files (as Excel files cannot be formatted).

Maximum print space is 176 mm x 252 mm. Possible widths for figures and tables are: 36 mm, 67 mm, 107 mm, 138 mm and 178 mm (Fig. 1).

Copyright permissions to use and reproduce images/data have to be obtained by the authors; the table of figures should list the names of the creators of drawings and photographs.

All maps, plans and artefact illustrations must contain a scale. When a calculated scale is used and the image has been formatted in relation to the abovementioned width, the scale can be provided in the caption. Maps and plans should further include a north arrow.

Captions

Figure captions should usually be in the following format:

Fig. with continuous numbering. Information about the figure (source: short title without from, after, source *etc.*; people with abbreviated first and last name, (if applicable) institution).

Fig. 6. Rectangular weights. Typology and distribution. 1-9: bronze; 10: lead; 11-15: stone.

Fig. 7. Types of goods sold in the marketplace. Note the circle glyph for the marketplace in the lower left corner (modified after SAHAGÚN 2008, 1336).

Fig. 8. The primary climatic zones and resource zones of Mesoamerica: The Pacific and Gulf Coasts, Tierra Caliente 0-1,000 msl, Tierra Templada 1,000-2,000 msl, Tierra Fria above 2,000 msl (HIRTH 2013, fig. 4,9).

Fig. 9. Aerial photo of the site of Kultepe from north-east (photo c. 1988; courtesy F. Kulakoğlu, Ankara University).

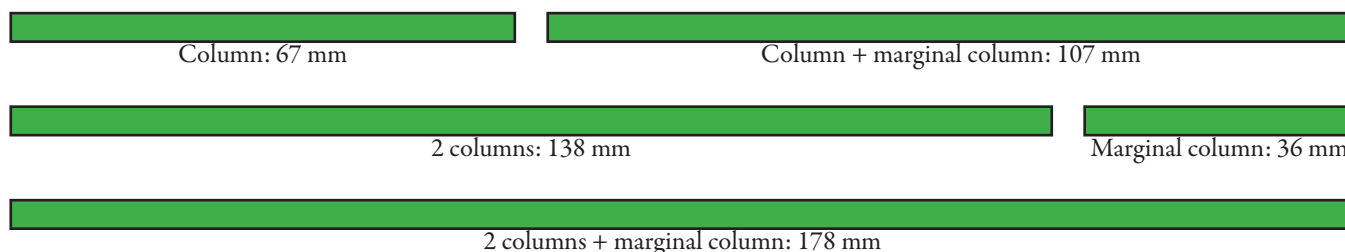
Figures specifications

Text in figures should be kept as brief as possible (annotations and legends can be included in the caption) and should be uniform for all figures.

Artefact illustrations on plates should be aligned horizontally and vertically to the frame.

All files have to be compatible with InDesign, Photoshop or Illustrator.

▼ Fig. 1. Possible widths for figures and tables.



Please submit digital images (raster images) as .tif, .bmp, .psd, .eps or .pdf files; avoid .jpeg or .gif; vector graphics should be submitted as .pdf or .ai files.

For scans at the scale of 1:1 a minimum resolution of 300 dpi (for the intended reproduction size!) is required for photographs (colour and BW).

For clear line drawings, *e. g.* AutoCAD plans, a scan as BW line drawing at a scale of 1:1 with a minimum of 1200 dpi is recommended; for drawings with different coloured gradation, *e. g.* artefacts, a scan in grey scale with a minimum of 600 dpi (800 dpi is better).

Proofs

After an initial review you will normally receive a pdf file with technical corrections as well as com-

ments to solve any questions the editor may have. When the layout is finished, you will receive a pdf file containing the thus created pages to correct any printing error. Changes to the text or figures can then no longer be made.

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