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in Beni Archeologici

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## INDICE

Elisabetta Govi <i>Editoriale</i>	7
Dennys Frenez <i>Cross-Cultural Trade and Socio-Technical Developments in the Oman Peninsula during the Bronze Age, ca. 3200 to 1600 BC</i>	9
Diana Neri <i>Alari fittili dall'Etruria Padana fra IX e VII secolo a.C.</i>	51
Carlo Rescigno <i>Tra Cuma e Orvieto. Caldaie in bronzo tardo arcaiche del Museo Archeologico Nazionale di Napoli</i>	75
Christopher Smith <i>Polis religion, lived religion, Etruscan religion. Thoughts on recent research</i>	85
Vincenzo Baldoni, Maria Concetta Parello, Michele Scalici <i>New researches on Pottery workshops in Akragas. Excavations in the artisanal area outside Gate 5 (excavation 2019)</i>	107
Elena Manzini <i>Topografia delle sepolture urbane di Bologna nel Medioevo</i>	117
Francesca Cavaliere <i>Dall'archivio analogico al modello digitale tridimensionale integrato: il Palazzo Sud-Ovest di Sennacherib a Ninive come caso di studio per il GIS 3D</i>	125
DOSSIER: PROGETTO SURVEY ISOLE TREMITI: STUDIO TERRITORIALE DELL'ARCIPELAGO TREMITESE	
Giulia Congiu, Valentina Gallerani, Francesca Meli, Luisa Pedico, Maria Petta, Andrea Piaggio, Francesca Rondelli, Martina Secci, Aldo Tare <i>Progetto Survey Isole Tremiti: studio territoriale dell'arcipelago tremitese</i>	135
RECENSIONI	
Laura Pagliantini, <i>Aithale, l'isola d'Elba. Territorio, paesaggi, risorse</i> (Federico Saccoccio)	181

# CROSS-CULTURAL TRADE AND SOCIO-TECHNICAL DEVELOPMENTS IN THE OMAN PENINSULA DURING THE BRONZE AGE, CA. 3200 TO 1600 BC

Dennys Frenez\*

*This paper presents an updated compendium of the archaeological and ancient textual data about long-range trade and multicultural interactions involving the nomadic and sedentary communities of the Oman Peninsula, with a specific focus on the Early Bronze Age including the so-called Hafit and Umm an-Nar periods (ca. 3200-2000 BC). Substantial evidence of direct and intermediated interactions are discussed in light of their contribution to the local development of particular socio-technical spheres and how they influenced the cultural and economic setting of the local society in the different phases. In order to properly interpret the long-term significance of this phenomenon, the discontinuous trajectory of mutual inputs with neighbouring regions is considered within a longer time span covering the seven millennia from the Neolithic to the beginning of the Iron Age.*

*Qh adt o t hrought hed arki ny ours oult os eet hel ighti ny ourm ind.*  
ToM aurizio

This paper presents the substantial update of an unpublished interim report written in 2014 to serve as a historical and methodological framework for a post-doctoral research about the cultural and commercial interactions between the Umm an-Nar communities of the Oman Peninsula and seafaring merchants and craftspeople from the Indus Valley, which I was conducting for the Department of History and Culture of the University of Bologna.<sup>1</sup>

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<sup>1</sup> I wish to thank first of all Prof. Maurizio Cattani and Prof. Gianni Marchesi, official tutors of my research in Oman between 2014 and 2016, as well as Prof. Nicol Marchetti and Prof. Elisabetta Govi, former and present director of the Post-Graduate School in Archaeological Heritage at the Department of History and Culture of the University of Bologna. In addition to my official tutors, I wish to thank Prof. Jonathan Mark Kenoyer, University of Wisconsin at Madison, a true mentor, colleague and friend during these years of research and fieldwork. I owe Mark my gratitude for having shared with me his immense knowledge about the study of material culture, for having covered most instrumental analyses that he has asked for, and not least for the great fun of smelting copper in Wadi Azaibah and bargaining at bazaars all over Oman! Thanks also Prof. Alessandra Avanzini and Dr Michele Degli Es-

posti of the Italian Mission to Oman, University of Pisa, in collaboration with the Office of the Adviser to H.M. the Sultan for Cultural Affairs, for having invited us to study and publish the Indus-related materials from Salut ST1. In this framework, sincere thanks to Prof. Sophie Morin, University of Rennes, for having involved me in her study of the ceramic pastes from ST1, and to all colleagues of the archaeological missions operating in Oman for their collaboration and sharing of data and materials. However, this research would not have been possible without the research permissions kindly issued by the Ministry of Heritage and Culture of the Sultanate of Oman. I owe my deepest gratitude to H.E. Salim bin Mohammed Almahruqi, Undersecretary for Heritage Affairs, H.E. Hassan bin Mohammed Al-Lawati, Adviser for Special Projects, Mr Sultan bin Saif Al-Bakri, Director General for Archaeology, Mr Khamis Al-Asmi, Director of the Department of Exploration and Archaeological Studies, Mr Sultan bin Ali Al-Maqbali, Director of the World Heritage Sites Department, Mohammed bin Hamed Al-Waili, Head of the Archaeological Site Bat, Al-Ayn & Al-Khutm, and Ms Ibusam bint Abdullah Al-Mamari, Head of the National Tentative List, as well as the many employees of the Ministry who assisted me during my research. In Oman, I wish to thank also Mr Jamal bin Hassan Al-Moosawi, Director General of the National Museum, and Ms Mouza bint Sulaiman Al-Wardi, Head of Studies and Research at the National Museum. None of my works could be complete without thanking Prof. Massimo Vidale for having instilled in my mind the love for the study of ancient material culture and for having then guided me through this long and winding road.

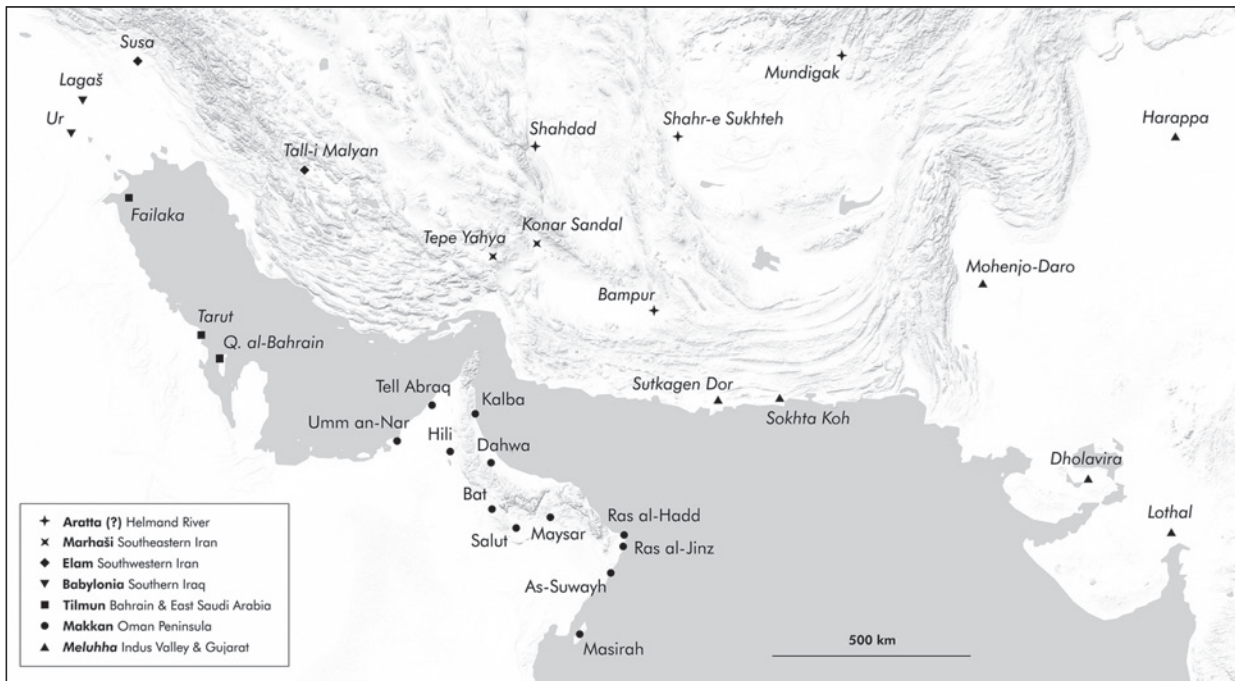


Fig. 1. Map of Middle Asia and adjacent regions showing the major Early Bronze Age sites and the regional political entities mentioned in the text (image by the author based on a customised Mapbox Studio™ image).

Cosmopolitan interactions and intercultural exchanges played, in fact, an unprecedented role in fostering new trajectories toward cultural complexity and economic affluence in the whole Middle Asia during the Early Bronze Age (Possehl 2007). In this period, the socio-economic and cultural setting of the communities settled in the Oman Peninsula, i.e. the Land of Makkam of the cuneiform sources<sup>2</sup>, significantly developed thanks also to substantial contributions from mutual interactions with the neighbouring cultures and polities (Fig. 1)<sup>3</sup>. Intercultural relationships be-

tween the Oman Peninsula and neighbouring and distant regions will be described starting from the Neolithic period and up to the beginning Early Iron Age to properly define the characteristics and significance of this phenomenon within an evolutionary frame including long-term trends and circumscribed patterns.

<sup>2</sup> The identification of Makkam as the Oman Peninsula, i.e. northern Sultanate of Oman and the United Arab Emirates, may be considered certain based mainly on information from Akkadian royal inscriptions and Ur III economic sources (Oppenheim 1954; Gelb 1970; Heimel 1987; Glassner 1989; 2002; Mackawa, Mori 2011; Laursen, Steinkeller 2017: 33). However, an Ur III tablet from Ur (UET 3 1193) mentioning a Greater Makkam, (*Ma<sub>2</sub>-gan<sup>ki</sup>-gu-la*), suggests that in some cases there might have been a distinction between the entire Oman Peninsula, possibly including also the littoral region of Iran immediately across the Strait of Hormuz, and the area usually frequented by the Mesopotamian merchants along the shores of the Gulf (Laursen, Steinkeller 2017: 34).

<sup>3</sup> In the following text, geographical terms and cultural spheres are spelt according to the Sumerian toponyms as in S. Laursen and P. Steinkeller (2017: 3), i.e. *Babylonia*

for southern Mesopotamia, *Tilmun* corresponding to the Barbar/Dilmun culture in present-day Kuwait, the eastern province of Saudi Arabia and Bahrain, *Makkam* corresponding to the Hafit, Umm an-Nar and Wadi Suq cultures in present-day northern Oman and United Arab Emirates, *Marhasi* corresponding to the Jiroft Civilization in the Kerman province of southeastern Iran, and *Meluhha* corresponding to the Indus (or Harappan) Civilization in the greater Indus Valley and Gujarat. According to S. Laursen and P. Steinkeller (2017: 6-7), such Babylonian geographical designations were broad and probably highly imprecise [É] in purely geographical terms, cf. the modern usage of terms such as the Indies, the Balkans, or the Americas. However, despite a persistent uncertainty in their precise definition, ancient toponyms will be often used here for the above-mentioned geographical region of the civilization under study.

*The Establishment of an Arabian Neolithic, ca. 8<sup>th</sup> and 7<sup>th</sup> millennia BC*

Drastic changes in the social and economic organisation, possibly induced also by substantial climatic changes, characterised many societies throughout Eurasia during the early Holocene (ca. 12,000 to 7,000 BC). This process eventually led to the so-called Neolithic revolution, when sedentary human groups began to cultivate plants and raise animals (Childe 1936: 66-104; Price, Bar Yosef 2011; Shennan 2018). However, hunters-gatherers communities of Arabia did not adopt such a socio-economic reorganisation until the end of the early Holocene (Magee 2014: 46 ff.). The Arabian Neolithic was based, in fact, on an original synthesis of elements both endemic and imported, where sheep and goat pastoralism was part of an integrated subsistence strategy that included abundant terrestrial and marine wild resources (Martin 1999: 87-104).

The central and most debated question about the appearance of Neolithic pastoralism in Arabia regards the origin of domesticated animals, which were not autochthonous of the Arabian Peninsula. Considering that the location of archaeological sites in southern Arabia falls beyond the

natural habitat of the wild ancestors of sheep (*Ovis orientalis*) and goat (*Capra aegagrus*), P. Drechsler (2007: 93-95), proposed that such species were introduced into Arabia already domesticated by small groups of herders arrived from the Levant. Recent genetic studies of Mitochondrial DNA from modern human groups in southern Arabia indicated that significant population movements from the Near East into southern Arabia occurred apparently between 13,000 and 12,000 BP (Al-Abri *et alii* 2012: 291-298). Moreover, the presence at sites in central Arabia of specific lithic tools also suggests direct influence from Levantine lithic assemblages and it might testify to the dispersal of groups from the Near East (Crassard *et alii* 2013) (Figs. 2a and 3).

According to S. Cleuziou and M. Tosi (2007: 56), domesticated animals arrived instead in southern Arabia as the result of trade activities and not along with migrants from the Levant. P. Magee (2014: 52), however, pointed out that, since maritime trade between the Levant and southern Arabia was not yet established and herds could not have travelled by themselves, it is unlikely that the shepherds would have gone back after having exchanged their animals with the local populations. Regardless of where the Neolithic

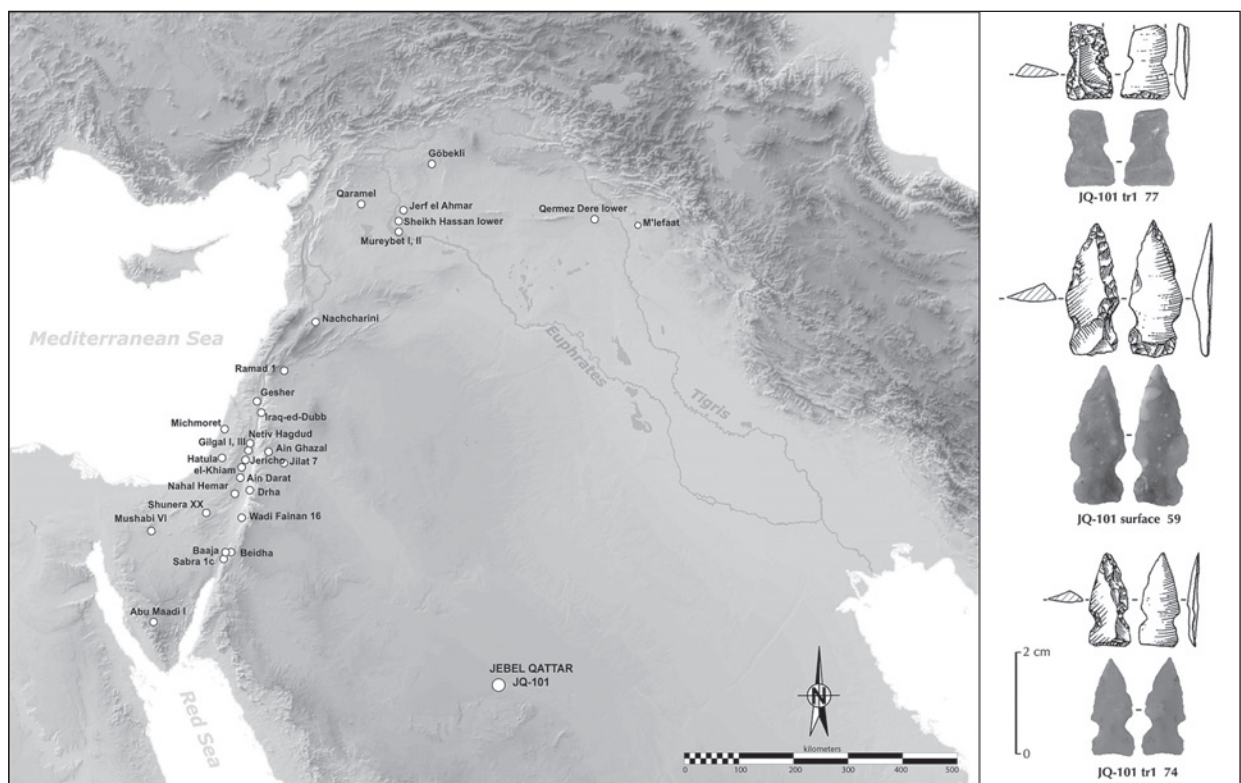


Fig. 2. Map of the Levantine sites with El-Khiam points and El-Khiam points from Jebel Qattar 101 (JQ-101) in Saudi Arabia (modified after Crassard *et alii* 2013: figs. 8-9).

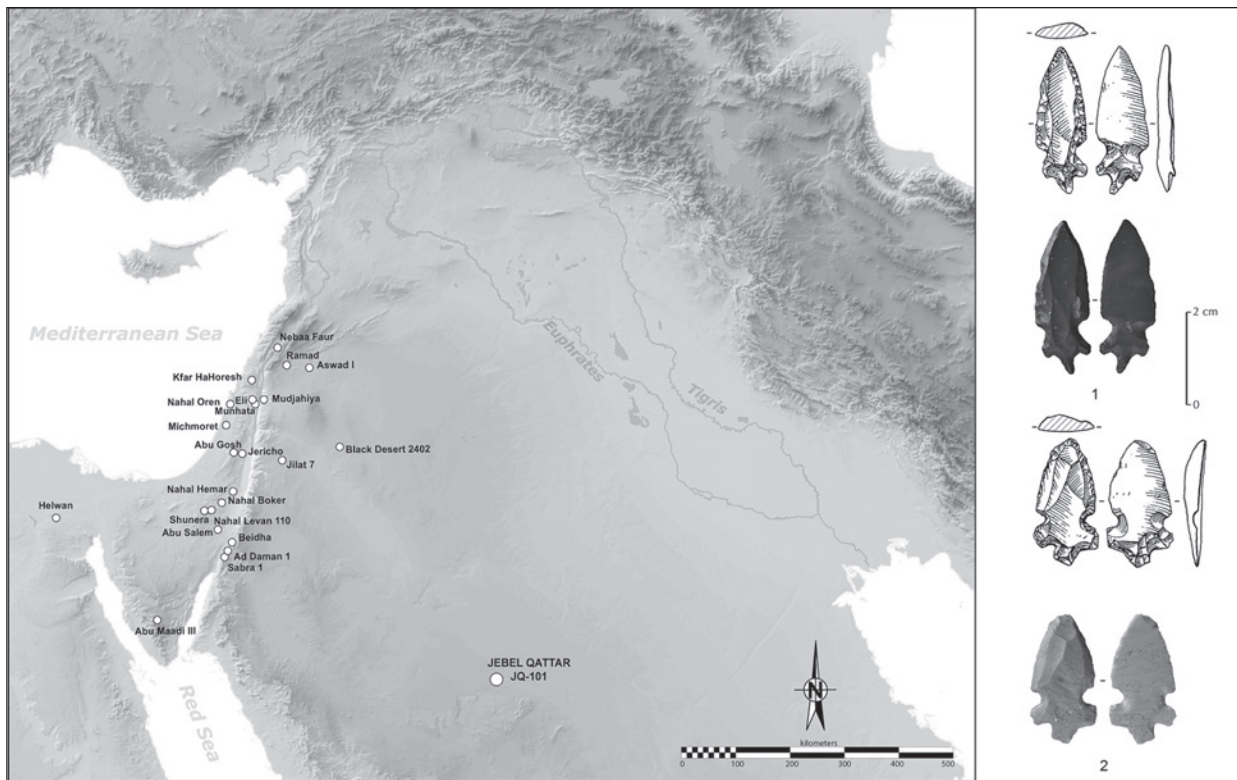


Fig. 3. Map of the Levantine sites with Helwan points and Helwan points from Jebel Qattar 101 (JQ-101) in Saudi Arabia (modified after Crassard *et al.* 2013: figs. 10-11).

inhabitants of Southeastern Arabia obtained their herds of sheep and goats, it is now clear that they adapted the exploitation of domesticated animals to the harsh Arabian environment creating of a coherent interaction sphere that encompassed the entire Arabian Peninsula from Yemen to Kuwait (Edens 2011: 115- 127).

*Middle Neolithic: The Ubaid expansion, ca. 6th and 5th millennia BC*

During the 6<sup>th</sup> and 5<sup>th</sup> millennia BC, most of southern Mesopotamia shared a common culture called Ubaid after the site of Tell al-Ubaid in southern Iraq where it was first found (Hall, Woolley 1927). Ubaid people settled in villages and developed advanced economic strategies for communal living, improving further the production of agriculture, animal breeding and pastoralism. Economic surplus led to the establishment of long-distance exchanges across a vast region that, according to the presence of Ubaid style black-on-buff pottery, stretched from the eastern shores of the Mediterranean to the Straits of Hormuz (Carter, Philip 2010: 1-22). Ubaid pottery con-

tainers reached also the northeastern shores of the Arabian Peninsula, up to more than one thousand kilometres from the southernmost Ubaid site in Mesopotamia (Carter 2013, 2018) ( Fig 4 ).

However, it is not yet clear whether this trade was led by either Ubaid or Arabian sailors, and whether the exchange of pottery containers was a

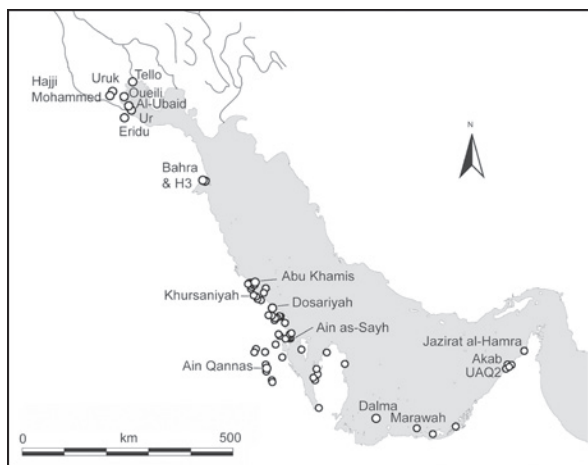


Fig. 4. Map of Ubaid sites in southern Iraq and sites with Ubaid materials along the southern shores of the Gulf (modified after Carter 2018: fig. 2.1).

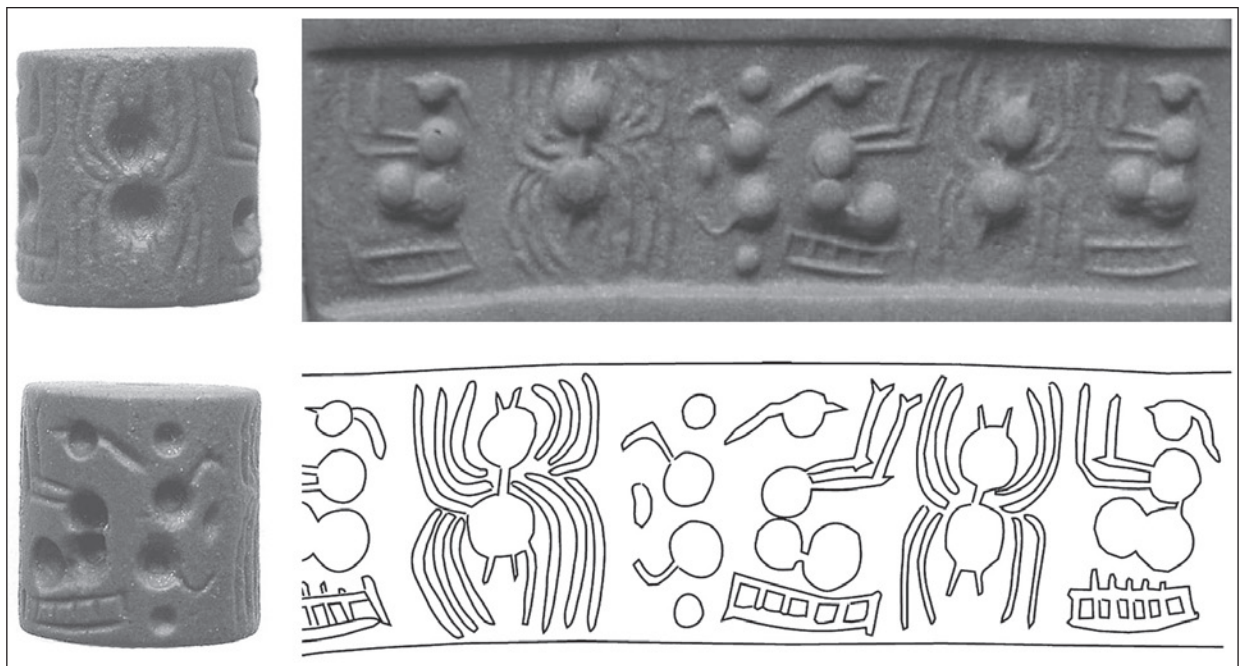


Fig. 5. Madinat Zayed (Abu Dhabi). Late Uruk cylinder seal in a greenish limestone with two pigtailed-ladies seated on a platform and two large spiders (modified after Potts, Pittman 2009: figs. 3-6).

primary target or just a secondary result. R. Carter (2006: 60) proposed that Ubaid pottery was not used only to contain and present food, but it was mainly redistributed or exchanged at communal events. A significant side effect of this phenomenon was the appearance at a few coastal sites in Saudi Arabia and Kuwait of the earliest local handmade coarse pottery (Oates *et alii* 1977: 222; Carter 2018). At the moment, there are only conjectural hypotheses about the type and nature of goods and commodities exchanged along and in return for Ubaid pottery containers, but it is likely that the native communities traded local pearls, flint and possibly also the first copper ores, as well as obsidian<sup>4</sup>.

#### *Late Neolithic: The Uruk period, ca. 4th millennium BC*

According to later cuneiform textual sources, but also to archaeological and archaeometric data, the Oman Peninsula was a major source of copper for southern Mesopotamia during the Early and Middle Bronze Age (Tab. 1)<sup>5</sup>. However, a consider-

able amount of copper from the Oman Peninsula reached Mesopotamia already during the Middle to Late Uruk period (ca. 3800-3200 BC), covering almost 30% of the copper objects analysed to date (Begemann *et alii* 2010: 159, tab. 5).

Contacts between the Oman Peninsula and Mesopotamia during this period are also proven by the discovery at Madinat Zayed, ca. 150 km southwest of Abu Dhabi, of a Late Uruk cylinder seal made from a greenish limestone that features two pigtailed-ladies seated on a platform and two large

provided them with unique mineralogical characteristics (Begemann *et alii* 2010: 141). The Samail ophiolite in the Hajar Mountains of Southeastern Arabia is the largest and best-exposed of such geological complexes worldwide, stretching over a length of 500 km and up to 100 km wide from inland Ras al-Hadd to the United Arab Emirates in the north, and it is famous for being rich in copper and chromite ores (Glennie *et alii* 1974; Coleman 1981; Searle, Cox 1991). A second, older ophiolitic complex is located on the Masirah Island, south of Ras al-Hadd (Peters 2000). In total, about 150 copper ore deposits and smaller prospects have been discovered along the Hajar Mountains and on the Masirah Island (Begemann *et alii* 2010: 141, cf. Goettler, Firth, Huston 1976; Weisgerber 1978, 1980, 1981; Hauptmann *et alii* 1988; Peters 2000). Mineralogical investigations and extensive chemical analyses defined the particular elemental composition of Omani copper ores, which are often rich in arsenic and nickel (Hauptmann 1985; Prange 2001; Craddock *et alii* 2003; Begemann *et alii* 2010: 135-136, 144-145).

<sup>4</sup> Oates *et alii* 1977; Charpentier, Phillips, Mery 2012: 1-6; Magee 2014: 69; Carter 2018.

<sup>5</sup> The copper ores of Oman are embedded in a unique geological context, the so-called Samail ophiolite, which



spiders (Pittman, Potts 2009: 109-114, figs. 3-6) (Fig. 5). According to D.T. Potts and H. Pittman (2009: 112-114), this iconography, which characterised seals found at sites in southern Mesopotamia but also in the Uruk colonies of Habuba Kabira and Jebel Aruda in northern Syria, possibly represented individuals involved in the production and trade of textiles. R. Carter (2013: 581) further proposed that it might thus testify to the exchange of textiles for copper in the Oman Peninsula during the Late Uruk period. Copper working was, in fact, already known and carried out in Oman as proven by the discovery of copper artefacts at the Late Neolithic shell-middens of Wadi S'abir and Ras al-Hadd, which dates to ca. 3800-3500 BC (Tosi, Usai 2003: 8-23; Usai 2006: 275-288).

*The Hafit period: Jemdet Nasr and ED I periods, ca. 3200-2700 BC*

Evidence for trade with Mesopotamia is more robust during the Jemdet Nasr and Early Dynastic I periods (ca. 3200-2700 BC), which broadly correspond to the so-called Hafit period in the Oman Peninsula (Al-Jahwari 2015). The Hafit period was a period of intense socioeconomic and cultural innovation characterised by the incipient establishment of irrigated oasis agriculture (Tengberg 2012; Desruelles *et alii* 2016; Charbonnier 2014; 2017) and by a new funerary ritual centred on the widespread construction of truncated-cone stone tombs, which eventually contained up to six individuals deposited in subsequent events (Bortolini, Munoz 2015: 65-67; Munoz 2019; Williams, Gregoricka 2019). A high number of Jemdet Nasr polychrome pottery vessels have been often found as single depositions inside Hafit type tombs in both the Sultanate of Oman and the UAE (Cleuziou, Tosi 2007: 114-115, figs. 102-104; Carter 2013: 583; Bortolini, Munoz 2015: 65, fig. 5), while a variety of other Mesopotamian vessel types appeared in a few settlements, including Hili 8 in the Al-Ain oasis and in the warehouse on the Umm an-Nar island in the UAE, and at Tower 1147 Matariyah in Bat in interior Oman (Carter 2013: 584; Thornton 2013: 598-617) (Fig. 6).

Instrumental analysis indicates that Mesopotamia continued to import Omani copper, which accounted for about 20% of the analysed objects in both the Jemdet Nasr and Early Dynastic I periods (Begemann *et alii* 2010: 138, fig. 5). In addition to such indirect evidence for copper processing, a large scale smelting site (Build-

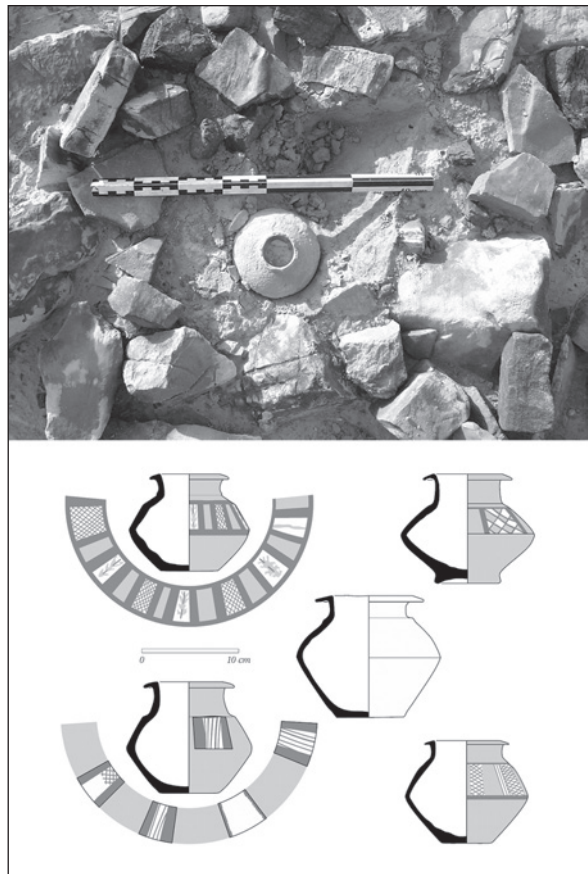


Fig. 6. Jemdet Nasr polychrome pottery vessel found in a Hafit type tomb at Zukayt (Wadi Halfayin, Sultanate of Oman) and other examples from Hafit type tombs on the Jebel Hafit on the border between the Emirate of Abu Dhabi and the Sultanate of Oman (composed after Bortolini 2019: 59 Cleuziou, Tosi 2018: fig. 93).

ing V) dating to the early Hafit period has been recently identified at Al-Khashbah in the interior of the Oman Peninsula (Schmidt, Döpper 2017; 2019), but there is also evidence for copper working along the coast at Ras al-Hadd HD-6 where copper tools are quite abundant (Giardino 2015: 115-125; 2019: 40-62). It has been proposed that the emergence of the Hafit culture has been a socio-economic response to the increasing demand for metals from Mesopotamia (Cleuziou 1996: 159; Loursen, Steinkeller 2017: 14).

R. Carter (2013: 584, cf. Azzar 2009) has remarked that the mud-brick domestic compounds excavated at the Hafit settlement HD-6 in Ras al-Hadd follow the same tripartite setting characteristic of the Ubaid, Uruk and Early Dynastic periods in Mesopotamia (see also, Azzar, Cattani 2018).

Besides the evident connections with Mesopotamia, the Hafit period also witnessed concrete evidence for the establishment of trade exchanges with Southeastern Iran, as proven by the discovery within Hafit graves of a characteristic black-on-red painted ware and ivory square beads (Potts D.T. 1993a: 163-212). Several authors proposed that links with this region might have contributed to the development in the Oman Peninsula of metallurgical and ceramic technologies (Cleuziou, Méry 2002: 273-316). In addition to the exchange of finished objects, relations with Mesopotamia and southern Iran were fundamental in this period also for the establishment of the irrigated oasis-farming economy. Wheat and barley, in fact, most probably originated from Mesopotamia, while date palm was endemic in southern Mesopotamia, southern Iran and Baluchistan (Boivin, Fuller 2009: 148; Parker A.G. 2010: 198; Tengberg 2012)<sup>6</sup>.

*The Umm an-Nar period: ED II and III, Akkadian and Ur III periods, ca. 2700-2000 BC*

The socio-economic and cultural setting of the communities settled in Oman developed significantly during the so-called Umm an-Nar period, between ca. 2700 and 2000 BC. In Mesopotamia, this timespan comprised the Pre-Akkadian, i.e. the Early Dynastic II and III (ca. 2700-2300 BC), Akkadian (ca. 2350-2200 BC), and post-Akkadian periods including the Third Dynasty of Ur (Ur III period, ca. 2100-2000 BC)<sup>7</sup>. However, in the absence of historical textual sources, it is not always possible to reach a comparable level of fine-grained chronological resolution also for the Oman Peninsula<sup>8</sup>.

In the Umm an-Nar period, there was a widespread intensification of sedentary settlements following the consolidation of irrigated oases farming throughout the region (Al-Jahwari 2009; Desruelles *et alii* 2016; Charbonnier 2014; 2017). Oasis cereal agriculture, already experimented at some sites during the Hafit Period, became complementary to nomadic husbandry, which how-

ever continued to be practised in perpetuation of the Neolithic traditions along with the exploitation of a wide range of wild terrestrial and marine resources. The establishment of inland oasis settlements is also marked by the appearance of mysterious monumental stone towers, whose function has not been fully understood yet (Cable, Thornton 2013; Thornton *et alii* 2016; Schmidt, Döpper 2017). The Umm an-Nar period witnessed also an intensification of copper production along the Hajar Mountains (Weisgerber 1984; 2007a; Bege-mann *et alii* 2010: 138-140) (Fig. 7).

The development of a new funerary ritual is witnessed by the appearance of the so-called Umm an-Nar type graves, large collective stone graves with a complex internal partition that required a collective effort in their planning and construction, which probably testifies to the final establishment of a kinship-based social structure based on interdependent specialized economic units engaged in various forms of resource exploitation<sup>9</sup>. According to S. Laursen and P. Steinkeller (2017: 26), in stark contrast to the neighbours of the Oman Peninsula, who all were organized in urban and proto-urban systems, Makkan society apparently continued its organization along kinship lines in some stratified tribal or clan-like system [É] Qualitative and quantitative variation in the collective Umm an-Nar tombs appears to be the result of social competition that aimed to enforce rank hierarchy among groups equivalent to extended households, in contrast to hierarchies between prominent individuals.

In the Akkadian period, Mesopotamian cuneiform texts started mentioning Makkan (Ma<sub>2</sub>-gan<sup>ki</sup>) (Glassner 1989: 181, cf. Hirsch 1963: 3, Sargon b2). This new source of invaluable information allows projecting the archaeological data into a historical perspective, describing in great detail several pivotal events that enhance our interpretation of the material record. According to the available royal inscriptions, foreign trade evidently became the main target of the Akkadian political strategy and the intention of bypassing any middlemen to facilitate the trade and maximise profits immediately led to a series of military campaigns against An an and Marha i in southern Iran and also against Makkan (Steinkeller 2013). After having conquered the principal seaports of southern Mesopotamia, Sargon launched a first naval expedition against Makkan, while his

<sup>6</sup> Date stones were found at some Late Neolithic sites in the Gulf region, which were, however, engaged in trading with southern Mesopotamia (Parker A.G. 2010: 198; Tengberg 2012).

<sup>7</sup> For an updated historical chronology of Mesopotamia in the third millennium BC, see Sallaberger, Schrakamp 2015; Manning *et alii* 2016.

<sup>8</sup> For a detailed discussion of the chronological issues, see Reade 2008; Laursen, Steinkeller 2017: 23.

<sup>9</sup> Bortolini, Tosi 2011; Bortolini, Munoz 2015: 71-73; Cable 2019; Bortolini 2019; Williams, Gregoricka 2019.

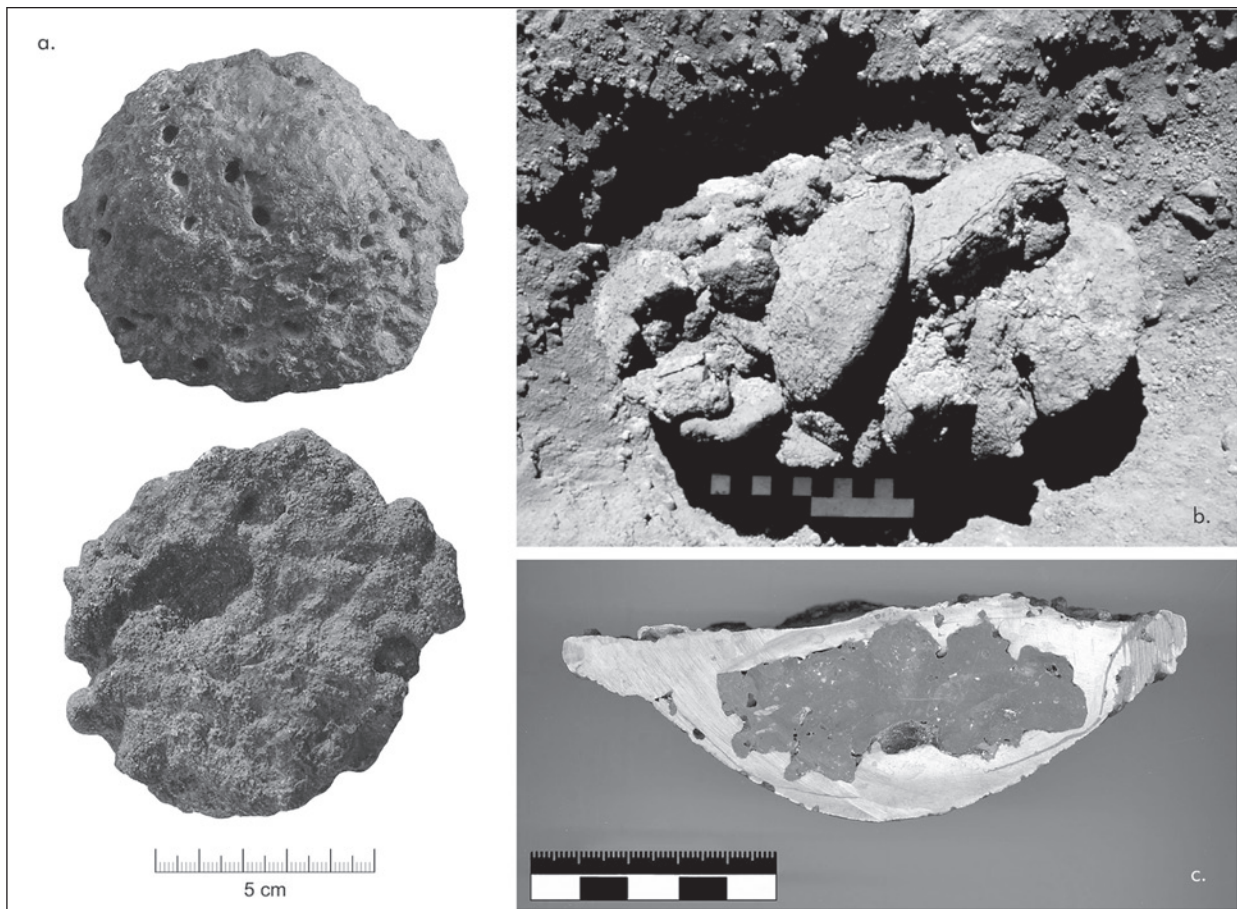


Fig. 7. Plano-convex ingots from the smelting of Omani ore in the Umm an-Nar period: (a) Ingot found at Ras al-Hadd HD-1 (after Giardino 2018: fig.09.10); (b) Hoard of ingots found at Al-Moyassar M1; (c) Sectioned 'fake' ingot with a core of slag from Al-Aqir (courtesy, Deutsches Bergbau-Museum Bochum).

son Mani tu u defeated there a coalition of thirty-two towns (*uru/ālum*) led by lords (*en/bēlum*), and after the so-called Great Rebellion Naram-Suen defeated Makkan again and took prisoner its lord (*en/bēlum*) named Manium (Laursen, Steinkeller 2017: 33)<sup>10</sup>.

Makkan seems, therefore, to have been a federation of small and decentralised tribal groups bound together by intertribal alliances led by lords on either temporary or permanent bases (Potts D.T. 2001: 40). However, S. Laursen and P. Steinkeller (2017: 36) dispute that the lack of historical parallels for simple tribal groupings successfully engaging in (international trade) [É]

one should seriously consider this possibility that Makkan may indeed have formed a single territorial state ruled by a royal figure such as 'lord' (*en/bēlum*) Manium, the later unnamed king (*lugal*) of Makkan who sent a gold-looking object to king Iltis of Ur as a diplomatic gift (Laursen, Steinkeller 2017: app. 1, text 1), or ruler (*ensi*) Nadubeli who sent a messenger named Wedum with a gift of Makkanite goats, most probably the Arabian oryx, to Amur-Suen (Steinkeller 1995: 50)<sup>11</sup>.

<sup>10</sup> In a forthcoming paper, G. Marchesi points out that the logogram *en* in Old Akkadian texts probably stands not for *balum* (= OB *bēlum*, lord) but rather for *malkum*, ruler – the term that was used to denote independent petty kings of foreign countries in contrast to vassal city-rulers, who were termed \**issi akkum* (ἴσι), governor instead (Alkhafaji, Marchesi in press).

<sup>11</sup> Nadubeli and possibly also Manium are names of Amorite origin (Steinkeller 1995: 62 note 13). S. Laursen and P. Steinkeller (2017: 56) suggested that sometime during the last few centuries of the third millennium BC Amorite tribes migrated into Oman and the territories along the Arabian side of the Gulf. This migration appears to have formed part of the same phenomenon that had brought other Amorite tribes to northern Syria and the middle Euphrates valley.

### *The Middle Asian Interaction Sphere*

Excavations at numerous sites throughout entire Middle Asia have proven that, in this period, long-range trade was of pivotal importance for the economic and socio-technical development of many interconnected cultures (Possehl 2007)<sup>12</sup>. This phenomenon was particularly relevant for the Umm an-Nar communities of the Oman Peninsula, where exchanges and interactions likely provided the background for the indigenous development of different technologies and contributed concretely also to substantial economic growth. In the Umm an-Nar period, while the export of copper, either directly or through Tilmun, increased to unprecedented levels (Begemann *et alii* 2010: 157-159, fig. 5), imports from Mesopotamia gradually reduced to be eventually limited only to specific technical spheres and Southeastern Iran started providing almost exclusively fine grey ware containers for marking social statuses in funerary rituals. The Indus Civilization emerged instead as the primary trading partner of the Umm an-Nar communities and Umm an-Nar type softstone vessels were traded to all regions of Middle Asia, including also Susa in the Khuzestan Province of Southwestern Iran and up to Gonur Depe in southern Turkmenistan (Potts D.T. 2008).

### *Trade with Mesopotamia*

In term of trade and interactions with foreign polities, the Umm an-Nar period witnessed a gradual shift from southern Mesopotamia to Southeastern Iran and mainly the greater Indus Valley as the preferred trading partners of Makkan. Mesopotamian type vessels progressively disappeared from the archaeological record in the Oman Peninsula (Thornton 2013: 608), with the sole exception of the warehouse on the Umm an-Nar Island (Frifelt 1991, 1995; Laursen, Steinkeller 2017: 18-19). At Hili 8, the amount of Mesopotamian ceramics gradually decreased from half of the pottery assemblage until they disappeared by 2400 BC (Cleuziou, Mery 2002: 286). In the Akkadian period, small amounts of Mesopotamian pottery were still im-

ported at coastal sites such as Tell Abraq, Kalba and Ras al-Jinz RJ-2<sup>13</sup>.

All the twenty sherds from large Mesopotamian jars discovered at Ras al-Jinz RJ-2, one of which had the cuneiform sign *kisal* scratched on the external surface (Cleuziou, Tosi 2000: 66, pl. 38; Glassner 2002: 364)<sup>14</sup>, resulted containing bitumen. The presence and use of bitumen at Ras al-Jinz RJ-2 is confirmed also by the discovery of almost three-hundred bitumen slabs stored in various buildings (Cleuziou, Tosi 2000: 63), which according to the excavators were stripped from one or more of the so-called Makkan Boats to be reused locally in different activities (Cleuziou, Tosi 1994: 745-762) (Fig. 8)<sup>15</sup>.

A number of Ur III sources from Girsu, but one from Umma, report the term ship of Makkan (*ma<sub>2</sub> Ma<sub>2</sub>-gan*), mostly in relation to caulkers, but also to ritual offerings, a purchase of bitumen, a member of the crew, a caulking operation, and four foresters who were cutting timber for a Makkan ship (Laursen, Steinkeller 2017: 106-17, note 12 and app. 2). According to S. Laursen and P. Steinkeller (2017: 106, cf. Zarins 2008: 222 n. 79; Carter 2012: 367), *ÇAL* though this term undoubtedly describes a seafaring ship, there are no grounds to think that the ships so designated were native Makkanite vessels. [É] We must conclude, therefore, that what is understood by this rare designation is a Mesopotamian ship frequenting the Makkan route or, more generally, a ship fit to be used on long-distance ventures in the Gulf. For what concerns the imports from Makkan, written sources mention only copper and gabbro/diorite. While Makkan strengthened and diversified the com-

<sup>12</sup> The term 'Middle Asia' is used after the definition provided by G.L. Possehl (2007) in his seminal paper about the so-called Middle Asian Interaction Sphere to indicate the vast region stretching from the eastern shores of the Mediterranean Sea to the Indus River basin, including Mesopotamia, the Gulf and Southeastern Arabia, the Iranian plateau and Central Asia.

<sup>13</sup> Laursen, Steinkeller 2017: 27, cf. Frifelt 1991; 1995; Potts 1990a: 93-94; Eddisford, Phillips 2009; Cleuziou, Tosi 2000: 53.

<sup>14</sup> According to J.-J. Glassner (2002: 364), «un graffito gravé sur l'apaneuse d'un vase mésopotamien galement exhumé à Ras al-Jinz; il pourrait s'agir du signe cunéiforme KIS-AL (Cagni, cité par Cleuziou *et alii* 1994) et l'on pourrait reconnaître la graphie abrégée du nom propre, mais le signe a été ajouté maladroitement, après la cuisson, et l'usage de inscrire des signes d'écriture sur la poterie ne s'est pas attesté en Mésopotamie; qui plus est, un signe tout à fait similaire figure sur des vases de Šahdad (Hakemi 1997: c. at. n. o. 259) ».

<sup>15</sup> According to isotopic analysis (Connan *et alii* 1998: 161, fig. 13), the bitumen found at Ras al-Jinz RJ-2 has a composition matching with the Hittite seepage along the Euphrates River in central Iraq, which might point to the continuation of a highly specialised trade involving particular commodities between Mesopotamia and Makkan.

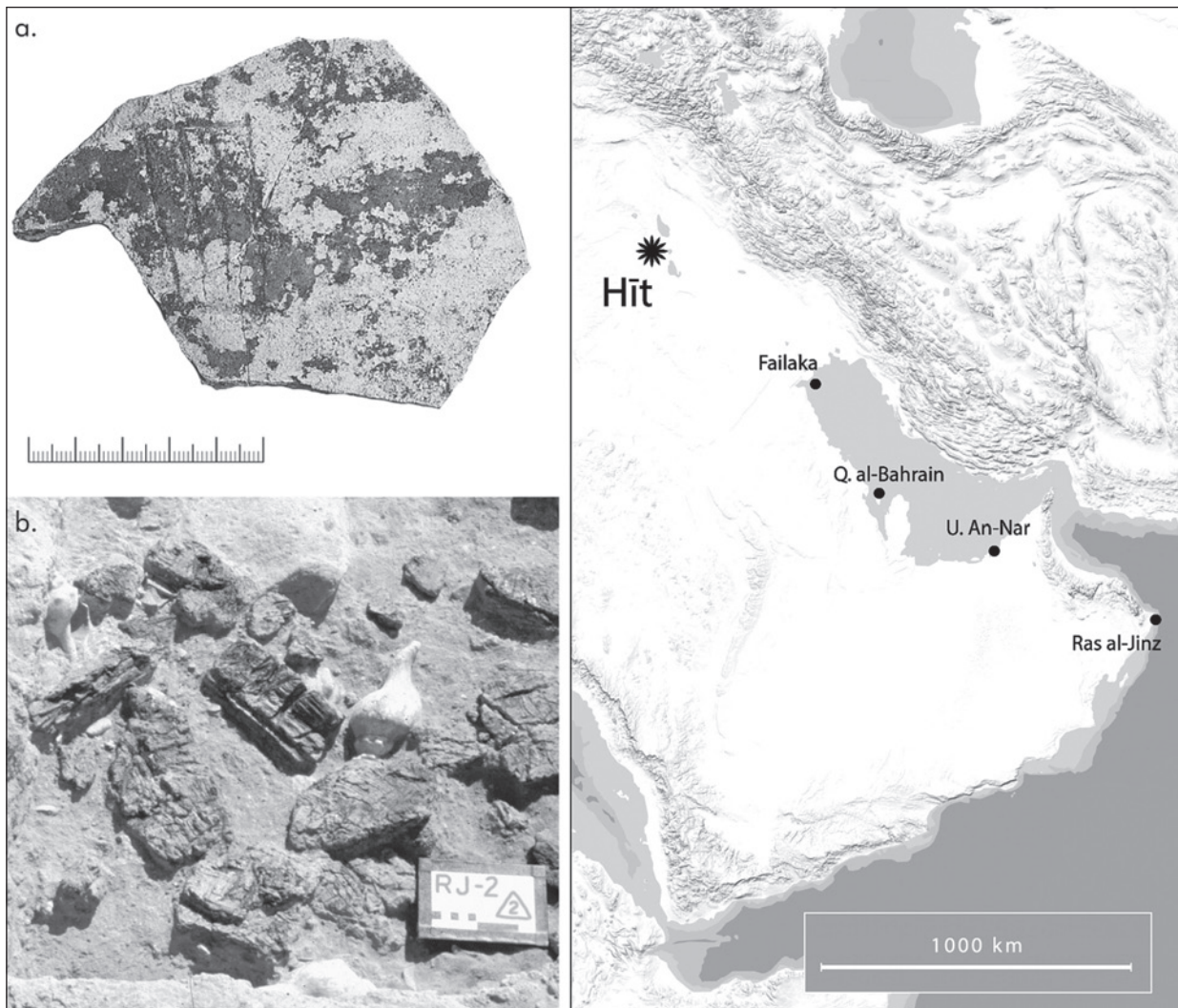


Fig. 8. Ras al-Jinz RJ-2 (Oman): (a) Sherd of a Mesopotamian jar with traces of bitumen and the cuneiform sign *kisal* scratched on the exterior (Cleuziou, Tosi 2000: pl. 38); (b) Bitumen slabs from the caulking of a Makkan boat found in Room 2 of Building I (Cleuziou, Tosi 2000: pl. 11). Bronze Age sites with evidence of bitumen originated in the Hehite region (Cleuziou, Tosi 2000: pl. 11).

commercial relations with Southeastern Iran and the greater Indus Valley, metallurgical analysis demonstrates that, thanks to a widespread increase of copper production in the entire Oman Peninsula (Weisgerber 1984; 2007a; Begemann *et alii* 2010: 138-140), the use of Omani copper in Mesopotamia gradually increased to eventually represent more than half (55%) of the analysed objects dated to the ED III and Akkadian periods (Begemann *et alii* 2010: 157-159, fig. 5) (Tab. 1 and Fig. 9). For this period, Mesopotamian textual sources include two attestations of the trade of copper with Makkan (Laurson, Steinkeller 2017: 37-38), namely a transaction between a palace (of Laga?) and a seafaring merchant named Lumma, who delivered 200 minas (ca. 100 kg) of

Makkan copper in exchange for 50 shekels (ca. 0.4 kg) of silver (ITT 1 1422), and the mention of ten minas (ca. 5 kg) of Makkan copper (STTI 68).

According to their propagandistic texts, after military campaigns in Makkan both Mani tu u and Naram-Suen mined a local black stone and took it back to Akkade but did not mention the mining of copper (Laurson, Steinkeller 2017: 32-33). Archaeological confirmations of these historical facts came from the analysis of the stones used for carving propagandistic stelae by Sargon (Heimpel 1982: 65-67; Nigro 1998: 85) and statues of Naram-Suen, Mani tu u and later of king Gudea of Laga, which resulted in varieties of olivine-gabbro and diorite that matches with those available in the Oman Peninsula or the

Cultural periods		Analysed artefacts	Copper from Oman	
Babylonia	Oman Peninsula		No.	%
Uruk	Neolithic / Hafit	23 (0)	6 (0)	27
Jemdet Nasr	Hafit	14 (2)	3 (0)	21
ED I	Hafit	40 (3)	8 (0)	20
ED II	Umm an-Nar	14 (1)	4 (0)	29
ED III	Umm an-Nar	48 (19)	23 (5)	48 (26)
Akkadian	Umm an-Nar	40 (13)	22 (6)	55 (46)

Table 1. Copper-base objects from Mesopotamia resulted containing copper from Omani ore (numbers in brackets refer to tin-bronze objects) divided by cultural period (modified after Begemann *et alii* 2010: tab. 5).

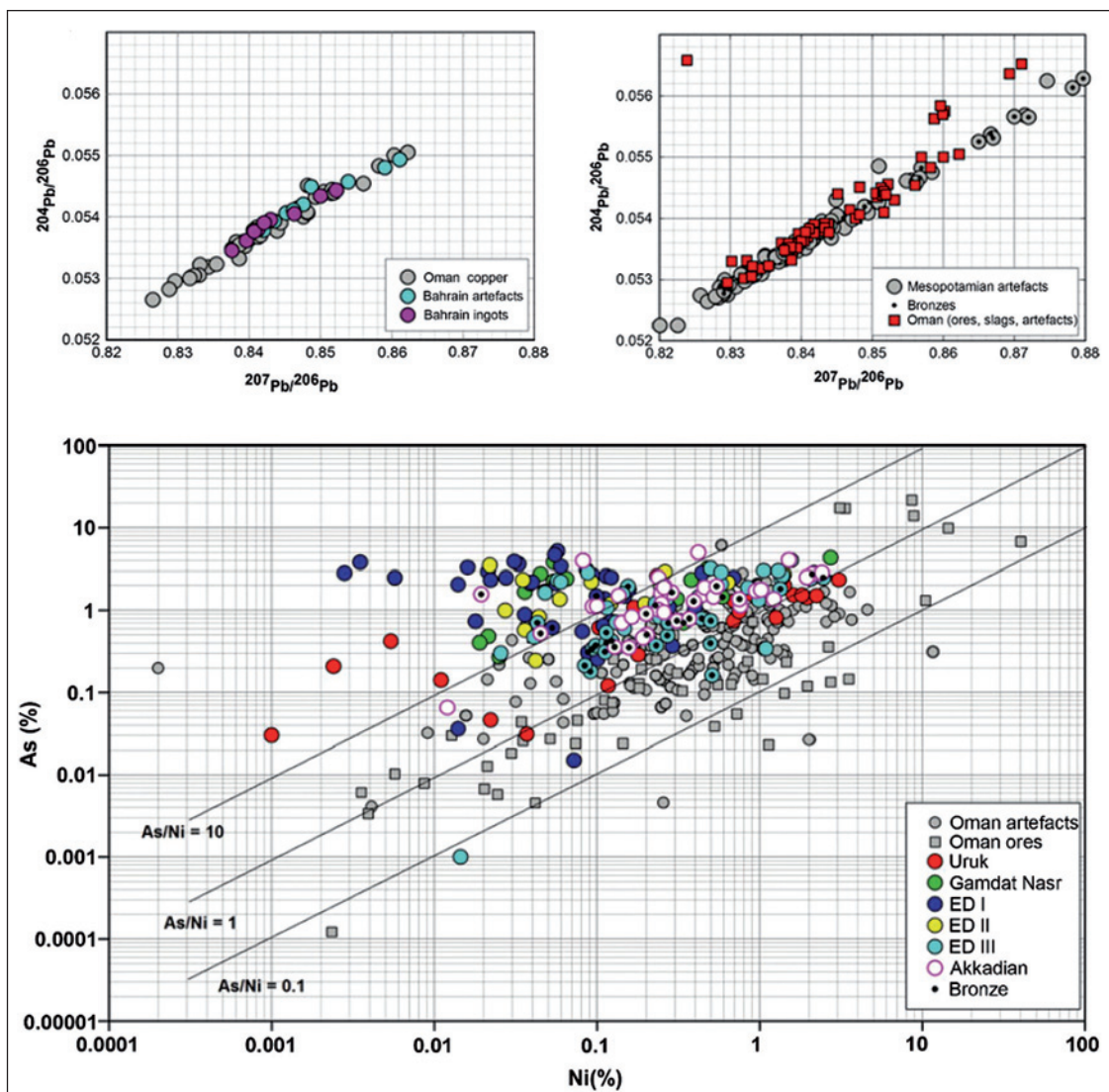


Fig. 9. Lead isotopic composition of copper-base objects from Tilmun and Mesopotamia compared with the composition of copper objects, slags and ore from Oman (composed after Begemann *et alii* 2010: figs. 10-12).

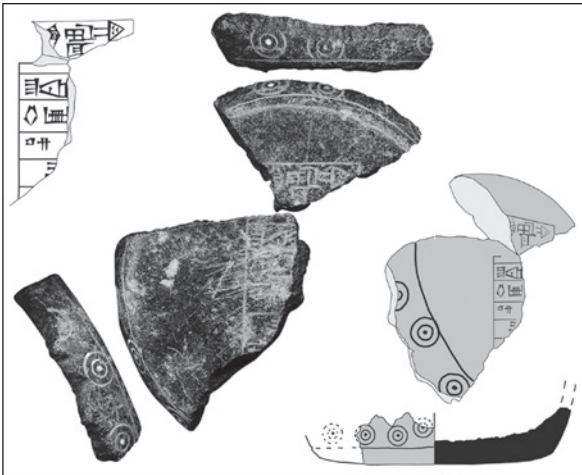


Fig. 10. Ur (Iraq): Fragment of an Umm an-Nar type softstone bowl with an inscription commemorating the Booty of Magan by Naram-Suen (Laursen, Steinkeller 2017: fig. 4a, redrawn after T.F. Potts 1989: fig. 10).

Iranian coastal region facing the strait of Hormuz (Heimpel 1987: 65-68; Yule, Guba 2001). Moreover, a few Umm an-Nar type softstone vessels bear an inscription that identifies them as part of the Booty of Makkan taken to Akkad by Naram-Suen (Potts D.T. 1986; Potts T.F. 1989) (Fig. 10).

The post-Akkadian breakdown resulted in an intensification of Makkan's commercial activities with Southeastern Iran and the greater Indus Valley. However, in the Ur III period, ca. 2100-2000 BC, there is a substantial textual record about the trade with Makkan, which was considered a military and commercial partner of the Ur dynasty (Steinkeller 2007: 226 and note 45). In this period, Mesopotamian external trade was controlled by the state through an organisation comparable to a foreign-trade ministry, who had under his command a consistent fleet of sea-going 'big ships' (*ma<sub>2</sub>-gal-gal*) based in the port town of Guabba (Laursen, Steinkeller 2017: 57-58). According to the numerous written sources available for the Ur III period, the merchandise traded from Mesopotamia to Makkan included primarily barley and garments, wool and perfumed oils, silver and sheep, which were traded mainly in exchange for copper, but also for an assortment of luxury items obtained from Southeastern Iran and the greater Indus Valley, such as carnelian and lapis lazuli, ivory objects and elephant tusks, sculpted chlorite vessels, gold and tin, mangrove wood, rosewood, ebony and bamboo (Uerpmann, Uerpmann 2008; Magee 2014: 116; Laursen, Steinkeller 2017: 39, 58-59).

#### *Tradewi thT ilmun*

Pre-Akkadian textual sources indicate that, in the Early Dynastic period, Mesopotamian merchants ventured only to Tilmun, which in this phase meant the eastern littoral of Saudi Arabia and the Tarut island (Maekawa, Mori 2011; Olijdam 2016), where they acquired a variety of products and raw materials imported from Makkan via the Umm an-Nar island port, as well as from Southeastern Iran and the Indus Valley, either directly or most likely through Makkan.

The earliest evidence of exchange between Makkan and Tilmun was represented by the Umm an-Nar type jars found in the burial mounds of Abqaiq, in eastern Saudi Arabia, in contexts dated to the ED III period between ca. 2600 and 2400 BC (Laursen, Steinkeller 2017: 16, cf. Piesinger 1983: figs. 50, 55). The main product traded from Makkan to Tilmun was, of course, copper (Marchesi 2011). Chemical analysis confirmed that copper objects found in Bahrain, thus later in the Akkadian and post-Akkadian periods, resulted being imported from Oman (Begemann *et al.* 2010: 156, fig. 11) (see Fig. 9).

Small scale trade relations between Makkan and Tilmun continued in the Akkadian period, witnessed mainly by small amounts of Umm an-Nar black-on-red pottery and Umm an-Nar type softstone vessels found at Tarut (Laursen, Steinkeller 2017: 25, cf. Bibby 1973: 37 fig. 33b; Burkholder 1984: 190 and 17b). However, due to the Akkadian commercial strategy, Tilmun eventually became just a minor trading station along the newly established direct trade route between Makkan and Mesopotamia (Laursen, Steinkeller 2017: 44, 90). In the Late Akkadian and Ur III periods, imported artefacts from Makkan in the burial mounds and at Qala at al-Bahrain, as well as at Tell F6 on the Failaka Island were restricted to small amounts of Umm an-Nar fine and domestic wares (Laursen 2009; 2010; 2011: 43-45 and note 8; Højlund 1994: 140, fig. 390; 2016: 95).

#### *Trade with Southeastern Iran*

Several scholars stressed the contribution of Southeastern Iran in the economic and socio-technical development of Makkan during the Early Bronze Age (Mey 2007a; Potts D.T. 2003: 156-157; 2005: 67-78; Thornton 2013: 609-613). According to S. Mey (2007: 160), the earliest local pottery production of the late Hafit and early Umm an-Nar periods was inspired by models from the Indo-Iranian region for their decoration, quality and colour of the paste, and shaping technique.

Black-on-red fine ware from Southeastern Iran was found at Umm an-Nar settlements and tombs across northern Oman, witnessing the strong commercial and cultural interactions between Makkan and Southeastern Iran in the Early Dynastic periods (Murray 1996; 2000: 121-123; Potts D.T. 2005). During the Akkadian period, Umm an-Nar type tombs contained increasing amounts of Emir grey ware and incised grey ware vessels imported from Southeastern Iran and mainly from the Kech-Makran region of south-western Pakistan, which were certainly regarded as funerary symbols of high-status (Murray 2000: 191-217; *Murray et alii* 2012) ( Fig.11) .

Remarkably, almost no sculpted chlorite vessels of the Jiroft type have been found in the Oman Peninsula (Laursen, Steinkeller 2017: 28, 30), where they seem to have been replaced by incised grey ware vessels (Murray 2000: 209-215; *Murray et alii* 2012).

*Indus trade with Makkan: A «Global» Marketing Strategy»<sup>16</sup>*

In the Umm an-Nar period, from the middle of the third millennium BC onwards, while imports from Mesopotamia reduced to almost cease and contributions from Southeastern Iran were restricted to the socio-technical sphere of pottery production and the provision of funerary symbols of high-status, the Indus Civilization clearly emerged as the primary actor in fostering trade exchanges and cultural interactions with the Umm an-Nar communities of Southeastern Arabia<sup>17</sup>. In this period<sup>18</sup>, in fact, imports from Indus Civilization sites, including local replications

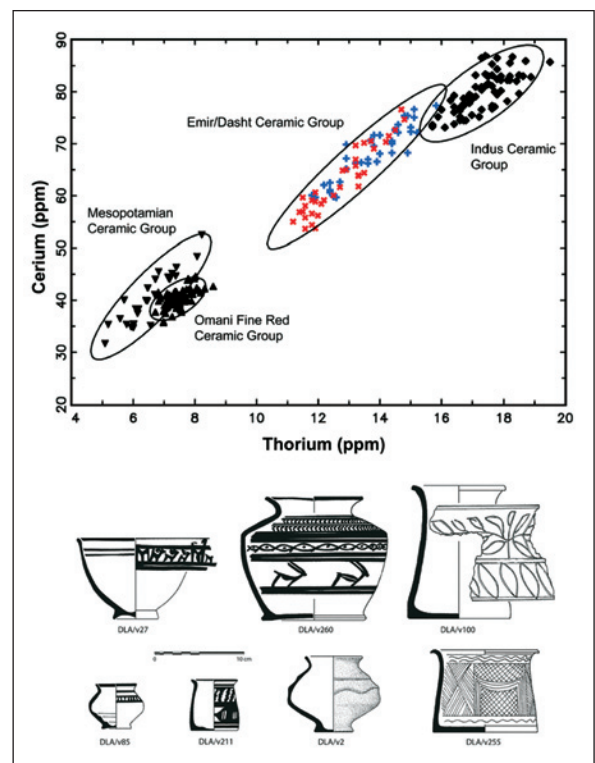


Fig. 11. Ceramic groups based on the chemical composition of the clay used in the different regions (in Red finds from Oman, in Blue from Makran) and a selection of Emir grey wares found in the Oman peninsula (composed after Murray et alii 2012: figs. 3, 5).

and imitations, overshadowed by number and variety the previous links with Mesopotamia and Southeastern Iran, testifying to the establishment of intensive and highly structured commercial relations between Makkan and the Indus.

*Ceramic Containers*

In the Oman Peninsula, the most robust indication of seafaring exchanges with the greater Indus Valley comes from the thousands of fragments of the large Indus black-slipped trading jars, often inscribed with Indus scriptorial signs scratched on their neck or shoulder (Fig. 12)<sup>19</sup>. Indus black

<sup>16</sup> The study of mutual trade and interactions between the Umm an-Nar communities of Makkan and seafaring merchants from the greater Indus Valley was the focus of the post-doctoral fellowship assigned by the Department of History and Cultures, University of Bologna. The following paragraphs, therefore, contain footnotes detailing the characteristics of the different commodities exchanged and the techniques and technologies required for their production, in order to eventually allow proposing a novel paradigmatic definition of the marketing strategy adopted by the Indus entrepreneurs that ventured into the Oman Peninsula.

<sup>17</sup> Cleuziou, Murray 2002; Thornton 2013; Frenze et alii 2016; Murray et alii 2017; Frenze 2018a; Kenoyer, Frenze 2018a, 2018b.

<sup>18</sup> It is still unclear when the first contacts between the Oman Peninsula and the northwestern regions of the Subcontinent were established. According to J.M. Kenoyer (Personal communication), some of the marine shell segmented bracelets found in the Late Neolithic necropolis of Ras al-Hamra RH-5 in the Capital Area of

Muscat (Bortolini, Munoz 2015: 62, fig. 2e), were possibly manufactured from *Turbinella pyrum*, a very large gastropod endemic to the shallow littoral waters in the Gulf of Kutch and along the Makran coast (Gensheimer 1984: 67). A grooved sherd, diagnostic of the Kot Dijian phase in the Indus Valley (ca. 2800 to 2600 BC), found at Tower ST1 near Salut, in interior Oman, most likely belongs to a residual Kot Dijian pottery production that is occasionally found at Indus Civilization sites in contexts dating up to ca. 2450 BC (Frenze et alii 2016: 112-113, fig. 4e).

<sup>19</sup> Indus black-slipped jars were tall and large containers ca. 70 cm high and 50 cm wide on average with a capacity





Fig. 12. Indus-type black-slipped jars: (a) Entire vessel from Harappa (Pakistan) (courtesy Harappa Archaeological Research Project); (b) Large sherd from Ras al-Jinz RJ-2 with Indus scriptural signs scratched on the exterior and thin-section of the Micaceous Red Ware used in the Indus region for making black-slipped jars (photograph by D. Frenez, courtesy Oman National Museum); (c) Indus-type rim with a black slip from Salut ST1 produced using the Red Sandy Ware typical of some ceramic productions of interior Oman (photograph by S. Méry, courtesy Italian Mission to Oman) (microphotographs of thin-sections from Méry *et alii* 2017).

slipped jars represented an important part (up to 35%) of the ceramic assemblage of both coastal and inland Umm an-Nar settlements (Méry 2000: 22, fig. 136 and tab. 59; Méry 2007b)<sup>20</sup>, while their recurrence is instead much lower in Tilmun and

of 30-40 litres, the largest holding as much as 85 litres (Dales, Kenoyer 1986: 83-84). Thick layers of black or dark purplish to brown slip, composed of mixtures of iron and manganese oxides, completely coat both their internal and external surfaces, suggesting that they were used to ship foodstuffs and storing liquids in non-porous conditions and, based on ethnographic comparanda, possibly also rolls of precious fabrics such as cotton and silk (Dales, Kenoyer 1986: 83-84; Kenoyer 1998: 97).

<sup>20</sup> For a substantial update in the distribution of Indus black-slipped jars in the Oman Peninsula, see Borgi *et alii* 2012; Charpentier *et alii* 2013; Frenez *et alii* 2016; Thorn-

they are virtually absent at sites in Mesopotamia (Méry 2000: 219).

In addition to large storage jars, Indus tall and globular jars with elaborate motifs alternating peacocks and trees, sun motifs, fish scales and intersecting circles painted in black on a fine red slip, have also been found in both domestic and funerary contexts throughout the Oman Peninsula (Vogt 1996: 107-132; Méry 2000: 239-243, figs. 144, 148-154; Frenez *et alii* 2016: fig. 5). Moreover, peculiar unslipped bottles (short carinated jars with short a neck and narrow throat), bearing Indus-style decorations painted in black on

ton, Ghazal 2016; Méry *et alii* 2017; Al-Jahwari *et alii* 2018; Cattani *et alii* 2019: 74-75.

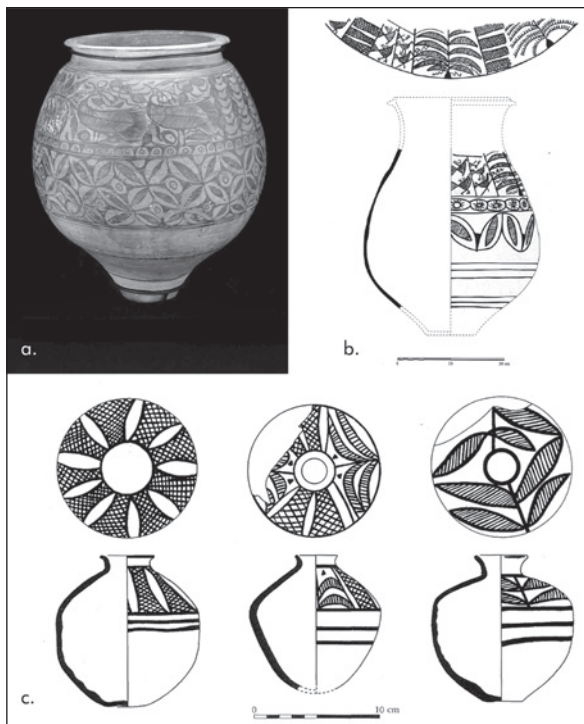


Fig. 13. Indus-type painted jars: (a) Indus black-on-red painted jar from Chanhu-Daro (Pakistan) (courtesy Museum of Fine Arts, Boston); (b) Indus black-on-red tall painted jar from Ras al-Jinz RJ-2 (Cleuziou, Tosi 2000: fig. 8); (c) Unslipped short carinated bottles with Indus-style motifs painted in black on the shoulder (Méry 2000: figs. 151-152).

the shoulder, are often found inside Umm an-Nar type tombs dating to the last centuries of the third millennium BC (Méry 2000: 240-244; Méry, Blackman 2005: 234-235) (Fig. 13).

The ceramic assemblage of Umm an-Nar settlements includes also different Indus pottery types used for food processing and presentation, such as cooking pots<sup>21</sup>, perforated jars<sup>22</sup>, pedes-

<sup>21</sup> Indus cooking pots were round-bottomed vessels with a short concave neck and the neck-body juncture marked by a sharp ledge (Dales, Kenoyer 1986: 132-134). Several layers of a fine slip, black or dark brown to dark glossy red, covered the ledge, shoulder and neck extending over to the interior of the rim, while the lower body and the base were covered with a thick, coarse sandy coating containing tiny pebbles and crushed terracotta inclusions to prevent cracks in the bottom of the vessel when it was placed on the fire. The ledge was probably designed to deflect the flames and keep the upper part of the vessel at a lower temperature. For their distribution in the Oman Peninsula, see Méry 2000: fig. 144.6; Frenéz *et alii* 2016: 112, fig. 4b; Thornton, Ghazal 2016: tab. 1, fig. 9.8a; Al-Jahwari *et alii* 2018: 46, fig. 20.1; Cattani *et alii* 2019: 74-75, fig. 5c.

<sup>22</sup> Indus perforated jars were tall, straight-sided unslipped vessels with the base perforated with a large hole through

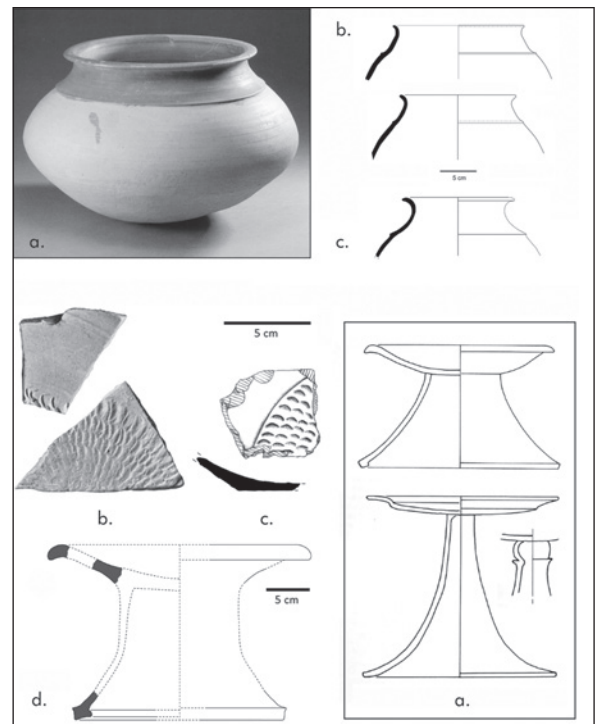


Fig. 14. Indus-type cooking pots and pedestalled dishes from: (a) Mohenjo-Daro (Pakistan) (Dales, Kenoyer 1986); (b) Salut ST1 (Frenéz *et alii* 2016), (c) Bat Tower 1146 Kasr al-Khafaji (Thornton, Ghazal 2016), (d) Jebel Sfaïq MT1 on the Masirah Island (Charpentier *et alii* 2013: fig. 7/6).

talledis hes<sup>23</sup>a ndpoin tedba seg oblets<sup>24</sup> (Fig. 14).

The application of complementary technological studies and geochemical analyses, includ-

its centre and the entire body pierced with small holes (Dales, Kenoyer 1986: 107-112). Perforated jars were likely used as a form of reverse strainer for preparing or drinking fermented beverages and/or dairy products (Kenoyer 1998: 154, fig. 8.7; Gouin 1990). For their distribution in the Oman Peninsula, see Méry 2000: 126, tab. 3; Thornton, Ghazal 2016: fig. 9.8.d; Frenéz *et alii* 2016: fig. 4d; Méry 2000: figs. 144.4, 147; Cattani *et alii* 2019: 74-75, fig. 5a.

<sup>23</sup> Indus pedestalled dishes or dish-on-stand are one of the finest and most distinctive Indus pottery types (Dales, Kenoyer 1986: 212-221). Produced in a variety of different combinations and proportions between the upper dish and its pedestal, they were probably used for food presentation during ceremonies and on special occasions (Kenoyer 1998: 154). Both the dish and the pedestal were covered with a very fine red slip and decorated with black painted motifs. In some cases, the dish is covered with complex circular patterns of fingernail-like impressions, which might have possibly served to grate hard cheese or crushing herbs (Gouin 1990). For their distribution in the Oman Peninsula, see Méry 2000: 236-238, fig. 144.1-7; Charpentier *et alii* 2013: fig. 7/4-6; Frenéz *et alii* 2016: fig. 4c.

<sup>24</sup> Recent excavations at the Umm an-Nar coastal site

ing petrography, X-Ray diffraction (XRD) and Instrumental Neutron Activation Analysis (INAA), allowed establishing that, in addition to actual imports of ceramic containers from different regions of the greater Indus Valley<sup>25</sup>, Indus pottery types were also produced in Oman using Indus shaping techniques and local clays and imitated by local potters (see Fig. 12)<sup>26</sup>. For what concerns specifically the Indus bottles, even if according to their geochemical composition most of them were produced in Sindh (Murray, Blackman 2005: 234-235, fig. 6), such a pottery type has never been found at any Indus Civilization sites, suggesting that they were intended for export only.

#### *Terracotta Toys*

Indus-style terracotta figurines of a bird and a bull, decorated on the exterior with black-painted designs have been found at Salut ST1 (Frenez *et alii* 2016: 113-114, fig. 7). This type of hollow, sometimes wheeled, painted animal figurines are typical of the Indus Civilization (Kenoyer 1998: 133, fig. 7/19; Clark 2017: app. F). The pottery assemblage of Salut ST1 included also the fragment of an Indus black-on-red painted jar intentionally chipped to make coarse circular discs (Frenez *et alii* 2016: 113, fig. 6). Similar pottery discs made in graduated sizes are quite common at Indus Civilization sites where they have been interpreted as counters or more likely as components of a game that is still played by children in South Asia (Kenoyer 1998: 132).

#### *Carnelian Beads*

Countless finds at both settlements and necropolises across the vast region stretching from the greater Indus Valley to the eastern Mediterranean, and from Afghanistan and Central Asia to South-eastern Arabia, demonstrate the value of carnelian and agate ornaments as symbols of the highest social statuses across the entire Middle Asia during the Bronze Age (Inizan 1995; Tallon 1995)<sup>27</sup>.

HD-1 in Ras al-Hadd have brought to light what may be the large fragment of an Indus pointed base goblet (Cattani *et alii* 2019: 75, fig. 5b). Such disposable drinking vessels are usually found only at large urban centres in the greater Indus Valley (Kenoyer 1998: 155).

<sup>25</sup> Gogte 2000; Murray, Blackman 2005; Murray 2007b; Murray *et alii* 2017; Frenez 2018a: 386, fig. 35.3.

<sup>26</sup> Méry 2000: fig. 145-146; Méry, Blackman 2005: fig. 7; Böhme, Al-Sabri 2011: 91-93, fig. 17; Thornton, Ghazal 2016: 206, 208; Murray *et alii* 2017; Al-Jahwari *et alii* 2018: 44.

<sup>27</sup> Carnelian and agate are finely-grained and translucent varieties of chalcedony, a microcrystalline quartz with a

Among these productions, the long biconical and bleached beads in carnelian manufactured by Indus master bead-makers were widely acknowledged and prized for their unique stylistic features and the skilled techniques necessary to produce them<sup>28</sup>. According to M. Vidale (2000: 40), Carnelian bead making was the first craft to reveal to the archaeological world the impressive standards of Indus technology. This statement would have probably been true also for the Bronze Age elites of Middle Asia. The production of such beads required, in fact, sophisticated manufacturing processes that involved the procurements of specific raw materials and the skilful application of advanced techniques for shaping, polishing and, in some cases, also decorating the beads, while special constricted cylindrical drills made from a very rare hard stone named *ernestite* were used to perforate them<sup>29</sup>.

Indus-style long and bleached carnelian beads have been found at sites in all regions directly interested by the Indus external trade, including

hardness of 7 on the Mohs scale, which appear respectively homogeneous or finely banded; carnelian is originally red-brownish but it turns bright deep red-orange to light amber after being properly heat-treated (Bonewitz 2008: 227). The greater Indus Valley comprises several sources of agate and carnelian of different quality and others are present in different regions of Middle Asia and the Near East (Law 2011: 266-282, fig. 8.33). Based on the results of quantitative geochemical analyses, the majority of agate and carnelian artefacts from Indus Civilization sites were made from three major sources in northwestern and eastern Gujarat (Law 2011: 298-299, fig. 7.36), which solely provided the high-quality and larger nodules suitable for producing the long and perfectly translucent Indus-style beads.

<sup>28</sup> The term *bleached beads* is used here instead of the traditional designation of this type of beads as *etched* (Beck 1933; Reade 1979; De Waele, Haerincx 2006), because the residual etch visible on the surface is only the secondary, unintentional result of the bleaching technique used to decorate them (Kenoyer 2017a: 140 cf. Kenoyer 2003). This distinctive technique, first developed by Indus bead-makers, used an artificial vegetal mixture of plant ash mixed with an organic glue obtained from the leaves of the Indian caper tree (*Capparis decidua*) to induce a highly-controlled local alteration of the microcrystalline structure of the stone, which resulted in a different reflectiveness of the bead surface that made the design looking white (for detailed descriptions of the bleaching techniques, see Vidale 2000: 56-57; Glover, Bellina 2001; Kenoyer 2017a: 140-141). The rare black designs might have derived from the intentional use of solutions including manganese (Mackay 1943: 200-201) or from an incorrect firing of the bead (Kenoyer 2017a: 140-141, fig. 17).

<sup>29</sup> Kenoyer, Vidale 1992; Vidale 2000: 40-58, figs. 13-14; Prabhakar *et alii* 2012; Kenoyer 2003; 2005a; 2017a; 2017b.

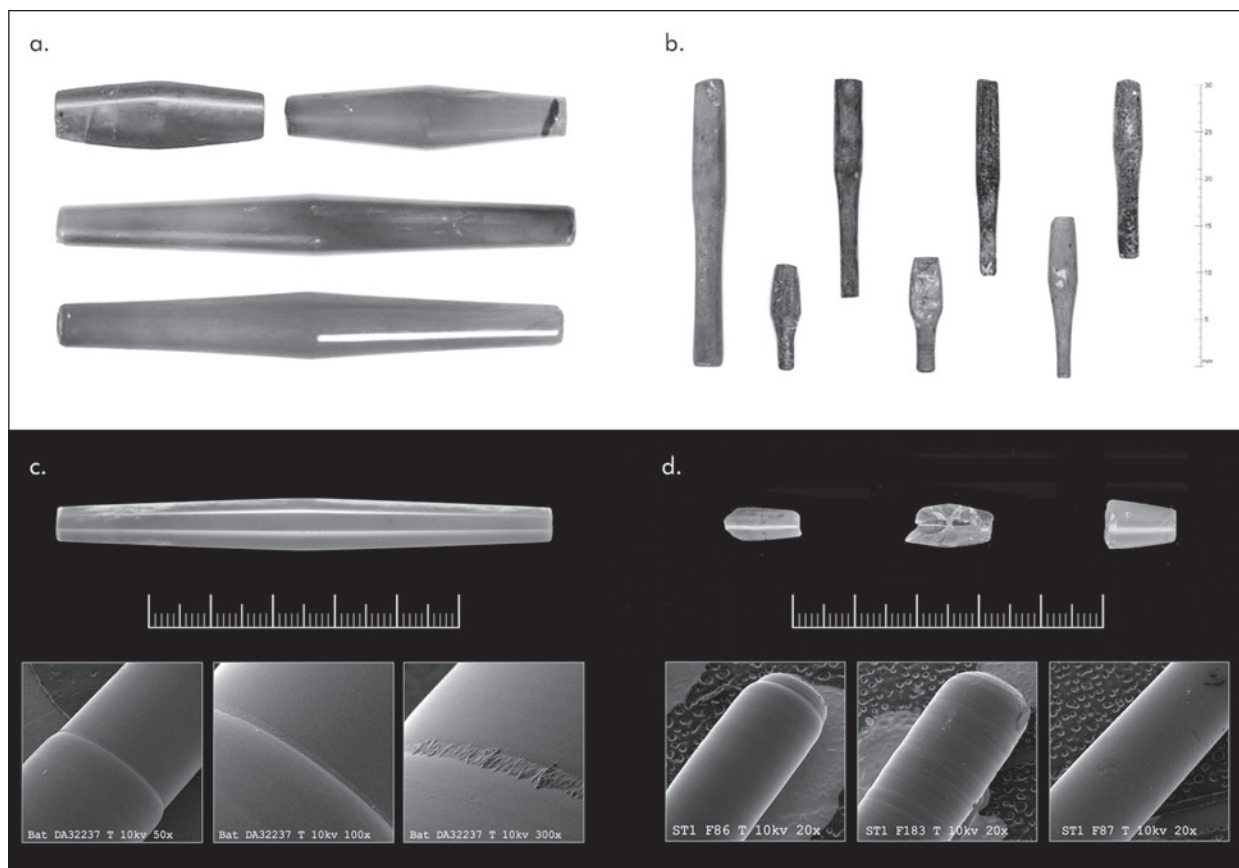


Fig. 15. Personal ornaments: (a) Indus-type long carnelian beads from Harappa, Pakistan (photographs by R.W. Law, courtesy Harappa Archaeological Research Project); (b) Indus-type constricted cylindrical drills in earnestite from Dholavira, India (photograph by R.W. Law, courtesy Archaeological Survey of India); (c) Indus-type very long biconical bead in carnelian from Tomb 155 at Bat, Sultanate of Oman \* (photograph P. Koch, courtesy German Mission to Bat, University of Tübingen); (d) Fragments of Indus-type long biconical beads in carnelian from Salut ST1, Sultanate of Oman \* (photograph by D. Frenez, courtesy Italian Mission to Oman). \* SEM microphotographs showing the use of Indus-type constricted cylindrical drills in earnestite (SEM images by J.M. Kenoyer after Kenoyer, Frenez 2018a: figs. 11-12).

of course Mesopotamia, both Southwestern and Southeastern Iran, and Southeastern Arabia<sup>30</sup>, but also in Central Asia, northern Syria, Anatolia, Caucasus, and the eastern Mediterranean including inland Egypt<sup>31</sup>. Remarkably, the detailed sty-

listic and technological study conducted by J.M. Kenoyer (2008: 26) on the carnelian beads from the Royal Cemetery at Ur demonstrated that Indus-trained bead-makers were settled in Mesopotamia using their skilled craftsmanship to meet the taste and demand of the local elites.

In the Oman Peninsula, a small number of Indus-style carnelian beads produced using Indus techniques and raw materials have been found in Umm an-Nar tombs and in structures accessory to monumental stone towers and, in some cases, broken Indus beads were reworked by local bead-makers to be reused in different fashions (Frenez 2018a:392) ( Figs.15a and 16) <sup>32</sup>.

<sup>30</sup> For Indus-style long carnelian beads, see Chakrabarti 1993; Pittman 1998; Evans 2003: 232, fig. 158a; Kenoyer 2008; Collins 2003: 301, fig. 201; for Indus-style bleached carnelian beads, see Reade 1979; Posschl 1996b: 153-154; Casal 1961: 138, fig. 23.

<sup>31</sup> Masson, Sarianidi 1972: 115, fig. 29a; Salvatori 1988: 184, figs. 62, 70, 71; Masson, Berezkin 2005: 388, fig. 21.57 and pl. 56/5, 56/9a; Sarianidi 2007: 115-116, fig. 211; 2007: 117, fig. 221; Rossi Osmida 2011: 142-143; Lume Pereira *et alii* 2017; Cholidis 2003: 144; Peyronel 2015; Ludvik *et alii* 2014, 2015; Abramishvili 2010: 171, fig. 2.5; Reinholdt 2003: 261, cat. no. 166.a; Alram-Stern 2004: 453-456, 1117-1119; Grajetzki 2012: fig. 2.

<sup>32</sup> For a summary, see Frenez 2018a: 390-392; Kenoyer, Frenez 2018a, 2018b; for Indus-style long carnelian beads, see Potts 2000: 131; Cleuziou, Tosi 2007: fig. 128;

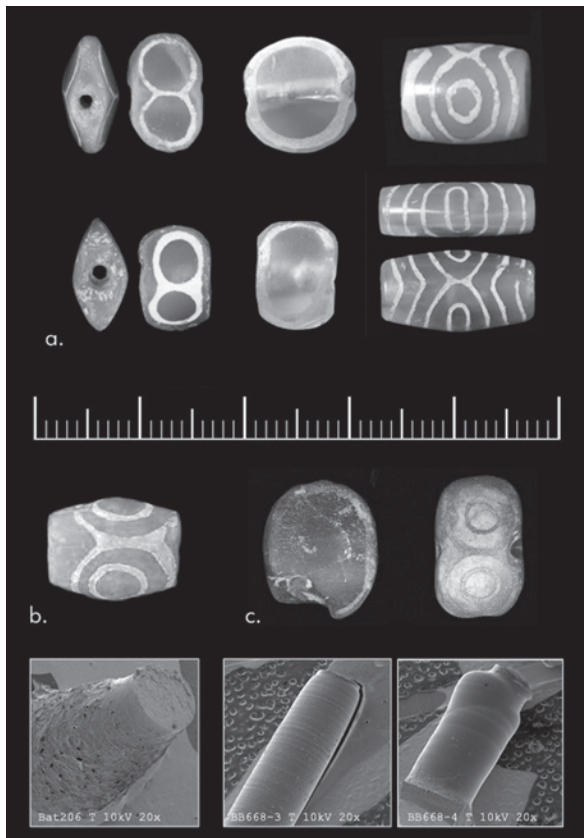


Fig. 16. Personal ornaments: (a) Indus-type bleached carnelian beads from Dholavira, India (photographs V.N. Prabhakar, courtesy Archaeological Survey of India); (b) Indus-type long barrel bleached bead from Tower 1156 at Bat, Sultanate of Oman\* (photograph by A.E. Mortimer, courtesy American Mission at Bat); (c) Indus-type lenticular bleached beads from Bid Bid, Sultanate of Oman (photographs by J.M. Kenoyer, courtesy Oman National Museum). \*SEM microphotographs of the drillhole impressions showing from left to right the use of a pecking perforation technique, an Indus-type constricted cylindrical drill in ernestite, and a long-tapered drill in solid copper with abrasive (SEM images by J.M. Kenoyer after Kenoyer, Frenez 2018b: figs. 36.8–36.9 and 36.16–18).

#### Metal Objects

Both the Oman Peninsula and the greater Indus Valley had long and largely independent traditions in the exploitation and transformation of copper minerals during since the end of the fourth millennium BC (Begemann *et alii* 2010; Kenoyer,

Miller 1999; Hoffman, Miller 2009; 2014). Recent Pb isotope analysis of copper and tin-bronze objects from Harappa and Dholavira seems to confirm that at least part of the copper used at these sites was actually imported from Oman (Hoffman, Miller 2009: 245; fig. 3; 2014: 705, fig. 24.3; Bisht *et alii* 2015: 10–16, fig. 7). Conversely, according to Begemann *et alii* (2010: 162), not a single piece of copper from the Aravalli Hills deposits in southern Rajasthan has been analytically detected at sites in the Oman Peninsula.

Considering the comprehensive articulation of the local metallurgical tradition, the importation of copper ingots and tools from the Indus Valley was probably not a priority for the Umm an-Nar communities of Makkan. However, metal objects of likely Indus origin, including several copper axes/adzes<sup>33</sup>, a large bronze tanged spearhead<sup>34</sup>, and possibly also a copper stamp seal<sup>35</sup>, have been found at several sites in the Oman Peninsula.

#### Ivory Objects

Combs, dice, gaming boards and pieces, and other objects for embellishment and gambling made from the ivory of Asian male elephants (*Elephas maximus* Linnaeus, 1758) have been found at several Bronze Age sites from the greater Indus Valley to Northern Syria, including the Oman Peninsula<sup>36</sup>.

<sup>33</sup> For their distribution on the Oman Peninsula, see Potts 1990a: 38–41, fig. 34–36; Frifelt 1995: 188, fig. 276; Cleuziou, Tosi 2000: 57, fig. 12.7; Jasim 2003: 88, fig. 6; Weisgerber 1980: fig. 78–5.11; for comparanda at Indus Civilization sites, see Mackay 1938: pls. cxvii.3, cxx.28–30, cxxii.9; Vats 1940: pls. cxxi.6/12, cxxiii.20/21; Mackay 1943: pls. lxii.21/23, lxiv.8, lxxi.10; Rao 1985: 536, fig. 106.1 and pl. cxxxxv.1.

<sup>34</sup> This beautiful 27 cm long Indus-style bronze tanged spearhead was found on the surface at the late Umm an-Nar site of Khor Bani Bu Ali SWY-3, about 40 km south of Ras al-Jinz (Méry, Marquis 1998: 217, fig. 7); for comparanda at Indus Civilization sites, see Marshall 1931: pl. cxxxxv.8; Mackay 1938: pls. cxiii.7, cxvii.8, cxxix.11; Vats 1940: pl. cxxi.20/21/24; Mackay 1943: pls. lxiii.2/4/5, lxiv.1/2/6, lxv.1/2; Rao 1985: pl. cxxxxv.1/2.

<sup>35</sup> X-Ray scan of this Indus-style square stamp seal made of copper, found at Ras al-Jinz RJ-2 (Cleuziou, Tosi 2000: 59–60, fig. 17), revealed an Indus unicorn engraved below a short inscription composed of a few Indus scriptorial signs; unfortunately, in the absence of proper quantitative analyses, it is not possible to ascertain whether the copper seal was also obtained from the Aravalli Hills in India (Frenez 2018a: 393, fig. 35.14a). An almost identical copper seal has been discovered at the Indus site of Lothal, in Gujarat (Rao 1985: 306 and pl. cliv.c; Frenez, Tosi 2005: 86, fig. 8).

<sup>36</sup> Potts 2000: 100–103; Morello 2014; Pfäzler 2013, 2016; Frenez 2018b.

Böhme, al-Sabri 2011: 149, fig. 22/158; Schmidt, Döpfer 2014: 198, fig. 6e and 205, fig. 11.f; Frenez *et alii* 2016: 114–115, fig. 8; for Indus-style bleached carnelian beads, see De Waele, Haerincx 2006: 33–35, fig. 1 and tab. 2; Böhme, al-Sabri 2011: 149, fig. 22/160; Schmidt, Döpfer 2014: 205, fig. 11g; Mortimer 2016: 142, fig. 6.37.

Such discoveries have been traditionally interpreted just as evidence for the import of finished objects from Indus Civilization sites<sup>37</sup>. New accurate studies of the ivory artefacts found in Central Asia have, however, portrayed a more complex picture, possibly involving ivory carvers from the Indus Valley itinerating across the region (Frenez 2018b). This model is supported also by the discovery in a late Umm an-Nar collective grave at Tell Abraç, in present-day United Arab Emirates, of ivory combs decorated with Central Asian motifs (Potts D.T. 1993b; 1994; 2000: 126-127) along with several other ivory combs and hairpins of likely Indus origin (Potts D.T. 2000: 102). In the Oman Peninsula, other Indus-style ivory combs decorated with series of dot-in-circles motifs have been found at Ras al-Jinz RJ-2 and in Grave Pit 0025 at Bat (Cleuziou, Tosi 2000: 30, pl. 32; Döpper, Schmidt 2013: 32, fig. 10; Frenez 2018a: 392-393, fig. 35.11) (Fig. 17).

#### Stone Weights

The use of highly standardised measurement systems to normalise manufacturing and building techniques and to control exchanges and their taxation was one of the founding principles of the Indus Civilization (Kenoyer 2010; Miller 2013; Danino 2014)<sup>38</sup>.

<sup>37</sup> In historical times, the habitat of *Elephas maximus* extended eastward to the Pacific coast of China and westward to the eastern Mediterranean (Olivier 1978; Trautmann 2015: 68-95, fig. 1.3). However, in the third millennium BC, the distribution of the Asian elephant was restricted to the South and Southeast Asia. Herds of an isolated subspecies of Asian elephant, called Syrian or Western Asiatic elephant (*Elephas maximus asurus*), which were living in restricted ecological zones of northwestern Syria from about the late Middle Bronze Age throughout the Early Iron Age, ca. 1700 to 700 BC, were in fact probably re-introduced in the region as the result of long-range trading with the Indus Valley (for the endemic hypothesis, see Pfalzner 2013; 2016; for the import of live animals, see Caubet 2013; 2016; Akırlar, Ikram 2016; Frenez 2018b).

<sup>38</sup> A still largely hypothetical basic length unit of ca. 1.76 mm has been proposed based on the graduation of several rules and the building size proportions (Danino 2014: 314-318, tab. 2). Information about the weights system is instead more robust (Kenoyer 2010; Miller 2013). The most typical Indus weights are cubical in shape and were usually made from the characteristic banded chert of the Rohri Hills in Sindh, but truncated spheres, long barrels, cylinders and cones made from a variety of stones were also used (Miller 2013: 166-169, tab. 9.2). The weight system had a unit of 13.7 g and followed a double and then a decimal progression (1, 2, 4, 10, 20, 30, 40 and 100), while it progressively halves for values smaller than one unit (1/2, 1/4, 1/8 and 1/16) (Miller 2013: 165-166, tab. 9.1).

Indus-type stone weights have been found at several sites outside the greater Indus Valley (Ratnagar 2004: 246-255, tab. 3.1), often in large rooms near or accessory to city suggesting their use not only for trade exchanges but mainly to calculate tributes and taxation (Kenoyer 1998: 99; 2010: 117). Remarkably, the so-called Dilmun mina mentioned in the cuneiform texts of the Ur III period and a series of barrel-shaped hematite weights of Mesopotamian type seem to follow the Indus weight system (Roaf 1982: 137-141; Zaccagnini 1986).

In the Oman Peninsula, only three cubical Indus-type stone weights (1, 2 and 2 units) have been found at Tell Abraç (Potts D.T. 2000: 128-129), while one cubical and one spheroidal have been found respectively in the collective grave Sh 6 and Sh 99 at Shimal (both 2 units) (Vogt 1996: 118, notes 9-10).

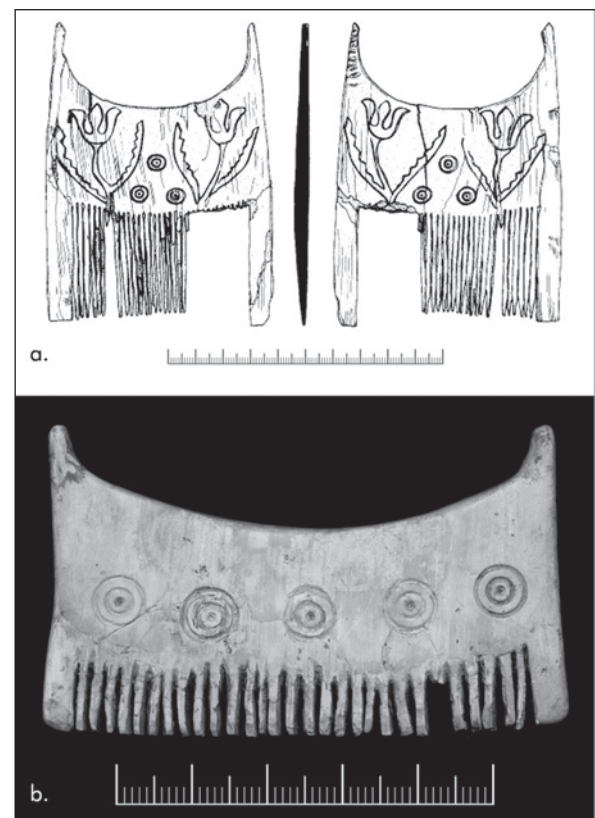


Fig. 17. Ivory objects: (a) Comb in ivory of Asian elephant decorated with Central Asian motifs from Tell Abraç (Potts 1994: fig. 53.8); (b) Comb in ivory of Asian elephant decorated with dot-in-circles motifs from Ras al-Jinz RJ-2 (photograph by D. Frenez, courtesy, Oman National Museum).

*Seals, Sealings and Inscribed Objects*

Square stamp seals made of fired steatite<sup>39</sup>, usually characterised with a main icon engraved below a short sequence of Indus scriptorial signs<sup>40</sup>, are one of the most distinctive standardised productions of the Indus Civilization (Kenoyer, Meadow 2010; Possehl 1996a: 27, fig. 6; Frenez 2018c). Indus standard seals were suddenly introduced between 2800 and 2600 BC along with the use of clay sealings and the Indus Script (Frenez 2018c: 170-171, note 5), and they remained in use without significant variations until the disaggregation of the Indus Civilization as an integrated socio-economic and political system in the first centuries of the second millennium BC (Kenoyer, Meadow 2010). As in all other contemporaneous administrative systems, seals were used in the Indus Valley mainly to control the access to rooms and goods managed a centralised level, but they likely had also some direct visual identification functions (Frenez 2018c: 172). If compared to the contemporaneous sphragistics productions developed by other urban cultures in the Near East and Middle Asia, Indus stamps seals appear to be highly standardised in terms of shape and raw materials, but also for the iconographic repertoire that characterised them (Ameri 2013; Frenez 2018c)<sup>41</sup>.

Excavations throughout the whole Middle Asia, brought to light an extremely high number (about a hundred) of imported Indus-type seals and seals with features related to the Indus seal

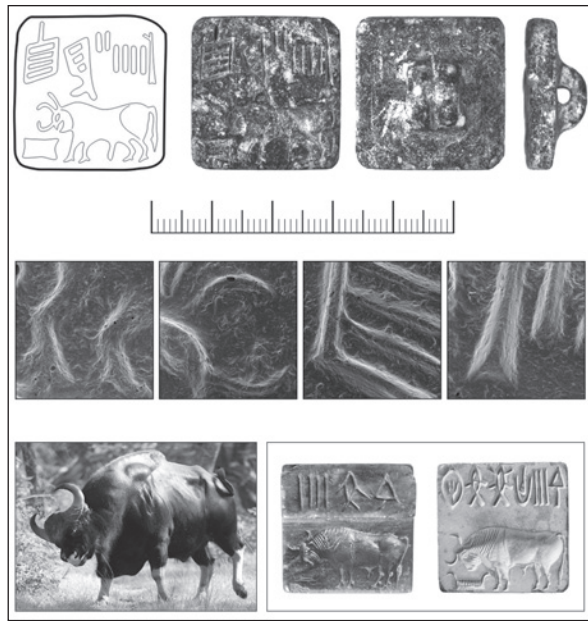


Fig. 18. Salut ST1 (Sultanate of Oman): Indus-type stamp seal made from a local chlorite featuring a wild Indian bison with the head lowered in front of a manger-like object carved below a sequence of five Indus scriptorial signs\* (drawing by M. Degli Esposti, photographs by D. Frenez, courtesy Italian Mission to Oman). \* SEM microphotographs showing the use of Indus carving techniques (SEM images by J.M. Kenoyer after Frenez 2018a: fig. 35.13). Comparison with a living specimen of wild Indian bison (*Bos gaurus*, Smith 1927) in the same posture portrayed on the seals (courtesy Bandipur National Park) and Indus standard seals with Indian bison from Mohenjo-Daro, Pakistan (Parpola *et alii* 2010: 370-317, figs. 13, 15).

<sup>39</sup> Indus seals and inscribed objects are published in a series of corpora edited by A. Parpola in collaboration with several colleagues (Joshi, Parpola 1987; Shah, Parpola 1991; Parpola, Pande, Koskikallio 2010).

<sup>40</sup> Indus scriptorial signs were carved specularly so as to be read correctly only once stamped on clay or other soft materials (Frenez, Tosi 2005; Frenez 2006; Frenez, Prabhakar, Bishtin *in press*).

<sup>41</sup> These icons were selected among a specific set of about a dozen animals, real or imaginary, which included the so-called Harappan unicorn, the Indian bison or short-horned bull, the water buffalo, the zebu, the Asian elephant, the tiger, a few species of wild goat and antelope, the rhinoceros, and the hare, but also a chimeric monster and other composite creatures, as well as rare narrative scenes possibly related to religious and mythological beliefs (Possehl 1996a: tab. 4, figs. 7-8; Frenez, Vidale 2012; Frenez 2018c: figs. 3-4). For what concerns their occurrence, at Indus site the unicorn stands for an average of more than 70% of the total cases, ranging from ca. 65% in the larger cities up to ca. 95% in the smaller settlements (Ameri 2013: 359-360, figs. 19.1-19.3, 19.6), while the Indian bison (*Bos gaurus* Smith, 1827) is almost the only animal represented on the Indus-type and Indus-related seals found outside the Indus Valley (Vidale 2005).

production embedded into the various local glyptic traditions (Frenez *in press*; Frenez, Marchesi, Vidale *in press*), both characterised in most cases by the icon of an Indian bison (*Bos gaurus* Smith, 1827) with the head lowered as grazing or charging (Vidale 2005). Actual Indus-type seals have not been found yet in the Oman Peninsula, but there are several seals evidently inspired to the Indus seal production, if not even manufactured in Oman by Indus seal-makers using local raw materials (Frenez *et alii* 2016: 116-117, fig. 9; Frenez 2018a: 393-396, figs. 35.13-15) (Fig. 18).

Two pottery fragments from a local jar found in the ditch surrounding the stone tower ST1 at Salut are highly informative about the nature of the commercial and cultural relations between the Umm an-Nar communities and merchants from Meluhha (Frenez *et alii* 2016: 117-118, fig. 10; Mery *et alii* 2017; Frenez 2018a: 394, fig. 35.12). The jar was, in fact, stamped twice before being fired using an elongated seal with engraved two

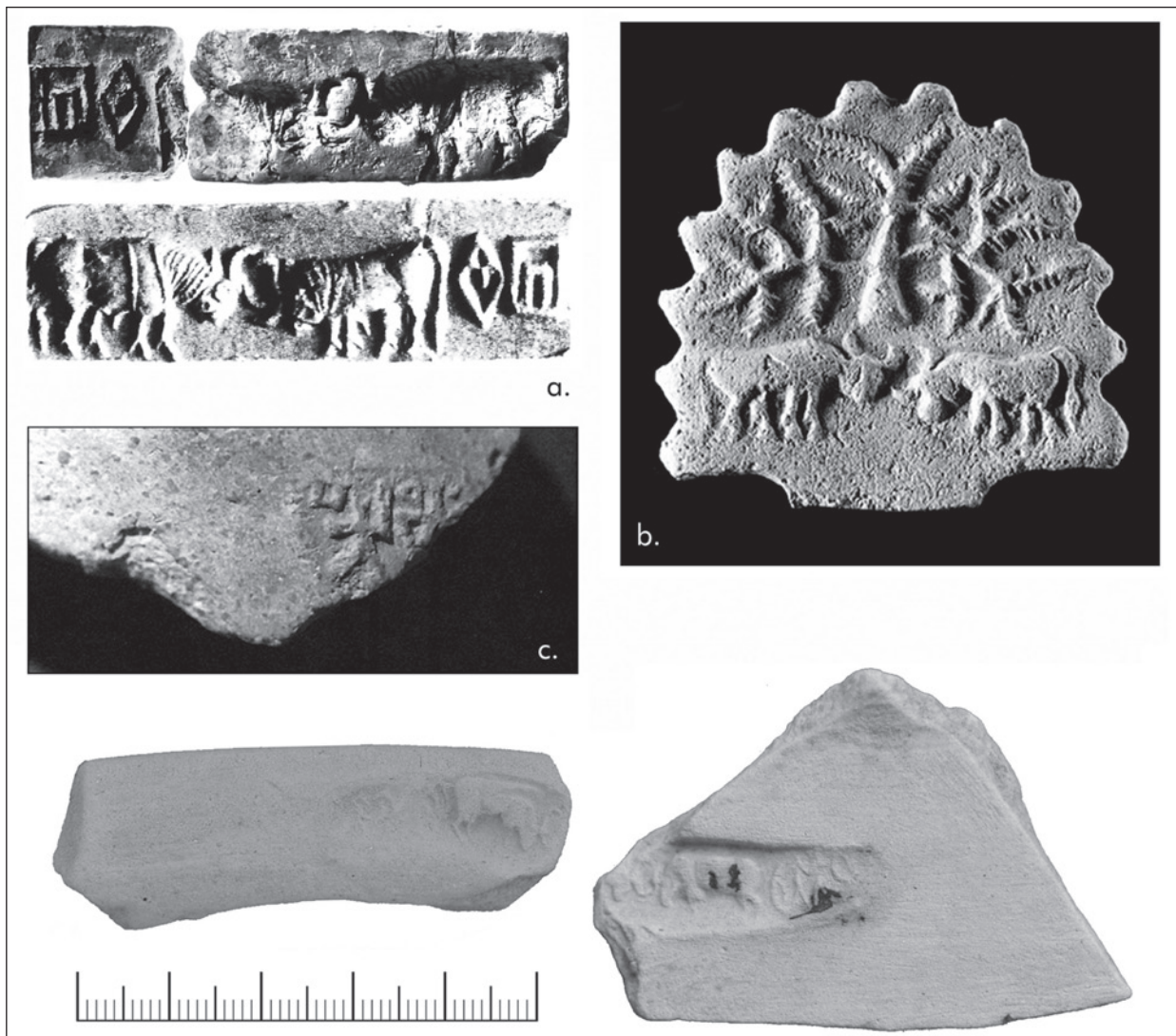


Fig. 19. Salut ST1 (Sultanate of Oman): Fragments of a local jar stamped before firing with an elongated seal featuring two Indian bison in combat and Indus scriptural signs (photographs by M. Degli Esposti, courtesy Italian Mission to Oman), compared with (a) Rectangular stamp seal with an identical arrangement of the motif and inscription from Mohenjo-Daro, Pakistan (Shah, Parpola 1991: 178, M-1367); (b) Moulded tablet in faience with a similar motif from Harappa, Pakistan (Parpola *et alii* 2010: fig. 64); (c) Fragment of a jar stamped with and Indus-inscribed seal from Tepe Yahya, Iran (Lamberg-Karlovsky, Tosi 1973: fig. 137).

Indian bison in combat and a sequence of Indus signs, almost identical to a seal from Mohenjo-Daro and comparable also to a moulded table in faience from Harappa (Shah, Parpola 1991: 178, M-1367; Parpola, Pande, Koskikallio 2010: H-1997B, fig. 64). In the Indus Civilization, the use of stamping goblets and jars with an inscribed seal or tablet is documented at several sites in the greater Indus Valley (for examples, see Parpola, Pande, Koskikallio 2010: 98-99, 243-251), but a pottery sherd stamped with an Indus-inscribed seal has been found also at Tepe Yahya in South-eastern Iran (Lamberg-Karlovsky, Tosi 1973: 34, fig. 137) (Fig. 19).

#### *Exports to the Indus Valley*

Evidence of exports from Makkan to the greater Indus Valley is quite limited but consistent with the apparent general impermeability of the Indus communities to external influences and the importation of foreign productions (Possehl 2002a). A small number of ingots and artefacts likely obtained from the smelting of Omani ore have been detected at Harappa and Dholavira using lead isotope analysis (Hoffman, Miller 2009: 245, fig. 3; 2014: 705, fig. 24.3-24.4; Bisht *et alii* 2015: 10-16, fig. 7) (Fig. 20). Beside copper-base objects, an Umm an-Nar type softstone bowl with a decoration of dot-in-circles around the rim was



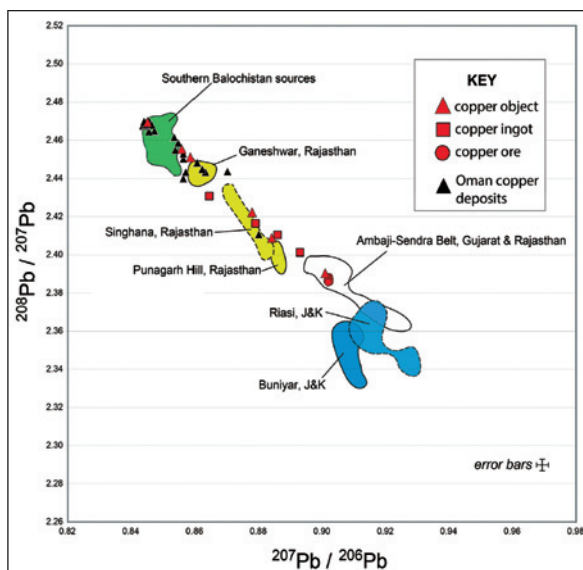


Fig. 20. Dholavira (India): Results of lead isotope analysis of copper-base artefacts from the site compared to South Asian and Omani copper sources (modified after Bisht *et alii* 2015: fig. 7).

found at Mohenjo-Daro (Tosi 1991: 112, pl. 95; Potts D.T. 2008: 176, fig. 26), while one entire and one broken Umm an-Nar type softstone rectangular vessels have been discovered at Dholavira (Bisht, Prabhakar 2015: 737, figs. 10.16)<sup>42</sup>.

Two Indus-inscribed stamp seals found at the Indus coastal site Lothal in Gujarat (Joshi, Parpola 1987: L-44, L-100; Frenez, Tosi 2005: 85-88, fig. 8), one in copper with a Harappan unicorn and one cut out from the lid of an Umm an-Nar softstone vessel, have direct parallels at Ras al-Jinz RJ-2 (Cleuziou, Tosi 2000: 58-59, fig. 16.3, 17). They can be, therefore, regarded as the result of mutual cultural and commercial interactions between Makkan and Meluhha.

#### *A «Global» Marketing Strategy?*

The significance of exchanges and mutual interaction between the Indus Civilization and the Umm an-Nar communities of the Oman Peninsula has often been discussed in the general context of the local economic and socio-technical developments (Vogt 1996; Cleuziou, Mery 2002; Thornton 2013). However, the organisation and mechanisms of these trade activities are not yet precisely coded.

<sup>42</sup> The wavy lines surrounding the dot-in-circles motifs decorating the broken sherd suggest a likely origin from a site in southeastern Iran.

Before the recent discoveries at sites in interior Oman (Frenez *et alii* 2016; Mery *et alii* 2017; Al-Jahwari *et alii* 2018), most of the data documenting reciprocal interactions between Makkan and Meluhha came from coastal sites<sup>43</sup>. The presence of Indus items at inland sites was mainly interpreted as the result of seasonal inter-tribal exchanges between the local communities settled in the interior and along the coast (Cleuziou, Tosi 2007: 172-173). The numerous fragments of Indus black-slipped jars from interior sites was mainly interpreted as the result of reuses (Mery, Blackman 2005; Vogt 1996: 125), while the indigenous production of a restricted number of Indus pedestal dishes would have resulted by the development of new dairy productions inspired by contacts with the Indus merchants along the coast (Mery 2000: 236-237; Cleuziou, Tosi 2007: 190).

There was, therefore, a general agreement that interactions between the local Umm an-Nar communities and Indus seafaring merchants were limited to a restricted number of coastal sites and that foreign traders did not venture into the interior regions (Cleuziou, Tosi 2007: 184-185, 235; Laursen, Steinkeller 2017: 19-20). The recent discoveries made at Bat, Salut ST1 and Dahwa allow proposing now a novel and more complex paradigm of intercultural economic interaction (Frenez *et alii* 2016; Frenez 2018a). It seems, in fact, increasingly clear that the Indus-type and Indus-related artefacts found at inland sites are not merely the result of down-the-line seasonal exchanges managed exclusively by the indigenous communities, but they probably testify to the presence of small groups of merchants and craft-people from the Indus Valley settled with their families in the interior of the Oman Peninsula to interact directly with the socio-economic entities that controlled the extraction and first processing of copper minerals and prized metamorphic rocks (Frenez 2018a: 396).

According to S. Laursen and P. Steinkeller (2017: 20), the fact that Indus black-slipped jars reach a much higher frequency in the Jaalan (coastal) area demonstrates, perhaps not surprisingly, that the Indus trade was primarily in the hands of the Makkan communities facing the Arabian Sea coast. However, even if a general reassessment of the available data and the results of new excavations (Frenez 2018a; Cattani *et alii* 2019), confirmed the pivotal importance of coast-

<sup>43</sup> Potts 1990a, 2000; Reade and Mery 1988; Reade 1990; Cleuziou, Tosi 2000.

al sites along the Indian Ocean seashore as seasonal entrepôts<sup>44</sup>, the production and use at inland sites of characteristic and technologically sophisticated Indus-type ceramic containers used for food storage, processing and presentation, might indicate that whoever was using them wanted to prepare food according to the traditional culinary habits of the Indus people (Frenez *et alii* 2016: 118-119)<sup>45</sup>. This hypothesis is complemented by evidence of the local use, and in some case also production, of Indus administrative tools, children toys and possibly even bridal paraphernalia (Frenez *et alii* 2016; Frenez 2018a).

Overall, this evidence, combined with other information about the organization of the Indus Civilization external trade in Middle Asia<sup>46</sup>, allow proposing the possible implementation by the Harappan merchants of an incipient model of coordinated global marketing strategy<sup>47</sup>, defined as a trading strategy that takes commercial advantage from regional particularities by creating foreign subsidiaries to manufacture and distribute original products according to the local trends and/or to maximize the exploitation of strategic

raw materials with a high international demand (Kotabe, Helsen 2009: 13-18)<sup>48</sup>.

*The Wadi Suq period: Isin-Larsa and Old Babylonian periods, ca. 2000-1600 BC*

At the opening of the second millennium BC, with the transition from the Umm an-Nar to the so-called Wadi Suq period (ca. 2000-1600/1500 BC), the Oman Peninsula witnessed a substantial socio-cultural and economic reorganisation (Velde 2003; Cleuziou, Tosi 2007: 255-276; Magee 2014: 182-196). The Wadi Suq culture formed, in fact, a less homogeneous social and cultural entity based on some degree of transhumance combined with a sedentary adaptation to the new economic conditions (Laursen, Steinkeller 2017: 66-67). After 2000 BC, only a limited number of settlements continued to be occupied with a general shifting toward the occupation of new territories (Cleuziou, Tosi 2007: 255-266; Magee 2014: 186-189; Laursen, Steinkeller 2017: 66). A new type of rectangular cist-graves for a single inhumation replaced the Umm an-Nar type tombs, while elongated collective tombs were used in the northern regions only (Frifelt 1975; Cleuziou, Tosi 2007: 268-270). The Wadi Suq period has also led to the sudden emergence of new styles in the material culture (Potts D.T. 2001: 44-48; Magee 2014: 183-186).

Copper production advanced at a reduced level, but Makkam ceased to play a significant role in supplying Mesopotamia with its copper (Weisgerber 1986; Begemann *et alii* 2010: 140, 161). According to G. Weisgerber (2007b: 278), in the Wadi Suq period, as a consequence of the relative isolation of Makkam in the first half of the second millennium BC, metal objects were almost all made of pure copper. This trend was inverted during the Late Bronze Age and continued in the Iron Age, when most objects were produced using bronze made by alloying local copper with tin

<sup>44</sup> Of course, as proven for comparable phenomena in later periods (Sagona 2004; 2013; Dietler, Lopez-Ruiz 2009), the foundation and maintaining of inland trading groups strongly depended on the simultaneous control over a few coastal sites to secure the shipment of goods and movement of people.

<sup>45</sup> For ethnographic studies about the use of traditional cooking vessels and tools by communities of immigrants, see Beoku-Betts 1995; Gumerman 1997; Koc, Welsh 2002; Anderson 2005.

<sup>46</sup> Kenoyer 2008; Frenez, Vidale 2015; Vidale, Frenez 2015; Frenez 2018c; Frenez, Marchesi, Vidale in press.

<sup>47</sup> The concept of a global economy is grounded in modern notions and practices and cannot be directly applied to a Bronze Age system. Nonetheless, a series of founding principles can be isolated with the aim of eventually verifying their occurrence in antiquity. However, a clarification on the different meanings of 'global market' and global marketing is necessary to put this embryonal hypothesis into the proper perspective. According to M. Kotabe and K. Helsen (2009: 13-18), under certain socio-economic and cultural conditions, a global marketing strategy might progressively develop from a domestic and ethnocentric economic organization to be projected into an international scenario for taking commercial advantage from regional particularities. A product or service is not simply exported to other regions, but it is proactively conceptualized and produced by independent regional subsidiaries to fulfil specific demands and commercial practices of each regional market the trading organization is planning to penetrate. A global market derives instead from the collective political and economic regulation of discrete multinational and global marketing strategies.

<sup>48</sup> Research conducted by different scholars over the past decades have suggested that several of the conditions underlying the embryonal development of a global marketing strategy were prototypically implemented by Indus trading communities, i.e. specific Indus items were traded to all regions of the then known world, Indus communities were likely settled in all regions interested by the direct trading of Indus items, specific Indus productions were localized and adapted to the regional particularities, Indus merchants used standardized administrative tools produced locally in the different regions to properly fulfil their bureaucratic needs of the local economies.

imported from Anatolia and Central Asia (Weeks 1999:49- 64)<sup>49</sup>.

External factors, such as the temporary disruptions of the long-range trade networks due to major political and cultural breakdowns in Mesopotamia, southern Iran and the greater Indus Valley, and/or a sudden drying of the climate have often been adduced to explain this dramatic phenomenon. According to S. Laursen and P. Steinkeller (2017: 67), It is less clear if this collapse of the Makkan trade was the result of domestic institutional changes in Babylonia [É] or if the major societal changes in Makkan momentarily made it impossible to obtain copper. However, the social and cultural transformations in the Oman Peninsula began when southern Mesopotamia was still flourishing under the Amorite dynasties of Isin and Larsa, and the Indus Civilization was still in its mature phase (Cleuziou, Tosi 2007: 273). According to P. Magee (2014: 124-125), the reorganization of the socio-cultural setting that defined the Wadi Suq period might have been the ultimate step in affirming the tribal values that had defined the Southeast Arabian society for generations against the tendency toward an amplified social stratification and political centralization created by the wealth accumulated through long-distance trade in copper during the Umm al-Nar period.

#### *Trade with Tilmun*

In the first centuries of the second millennium BC, Marhaši was absorbed by the kingdom of Umma with a shift towards overland trade networks across the Iranian plateau (Steinkeller 2007), and the Indus Civilization disaggregated as an integrated socio-economic and political system with the emergence of a new mosaic of local cultures each with specific cultural traits (Lahiri 2000; Possehl 2002b: 237-245; Kenoyer 2005b; Wright 2012). In Mesopotamia, the centres of power shifted towards the north and they began to obtain copper and tin mainly from Cyprus (Weisgerber 2007a: 254). This new scenario is confirmed by the absence of Makkan, Marhaši and Meluhha from the Isin-Larsa sources onwards (Laursen, Steinkeller 2017: 69): immediately after the demise of the Third Dynasty of Ur, the Meso-

potamian big ships ceased to sail to Makkan and seafaring trade in the Gulf was monopolized by the commercial fleets of Tilmun.

Tilmun-type pottery, including Barbar red-ridge and chain-ridged wares, started to appear in association with the new local Wadi Suq pottery at sites along the coast of Oman, including mainly Tell Abraq, Simal, Kalba and Munayir in the north but also Sur and Ras al-Jinz RJ-1 along the coast of central Oman (Murray *et alii* 1998: 135-137, fig. 3; Potts D.T. 2000: 120-120; 2001: 48; Cleuziou, Tosi 2007: 273, figs. 291-292) (Fig. 21). According to S. Cleuziou and M. Tosi (2007: 273), these southern finds might testify to the economic importance of the newly established activities of copper extraction on the Masirah Island. According to the available texts (Laursen, Steinkeller 2017: 68-70), Tilmun became, in fact, a commercial source of copper for Mesopotamia by transshipping the ingots still arriving from Oman<sup>50</sup>, along with an assortment of luxury goods, either local or obtained through seafaring trade.

#### *Trade with Sindh and Gujarat in the Late Harappan Phase*

The Late (or Post) Harappan phase is marked by a generalised population shift to previously more marginal regions, probably due to a socio-economic adaptation to the new cultural and political setting of the region after the disaggregation of the Indus system and the consequent disruption of the integrated trade networks that linked different areas across the Indus alluvial plains<sup>51</sup>. During the first half of the second millennium BC, while the local trade circuits were reorganised on the basis of a new mosaic of interacting regional cultures, long-range exchanges across the Arabian Sea appear to have survived, even if at a reduced level, at least for a few sites in Sindh and Gujarat (Wright 2012) (Fig. 22).

<sup>49</sup> A significant exception to this trend is represented by Tell Abraq, where tin-bronze objects are proportionately more frequent than objects in pure copper throughout the entire Wadi Suq period thanks to the strategic location and economic orientation towards long-range trading of this site (Weeks 1999:49- 64).

<sup>50</sup> A collection of offerings of copper finds dated to ca. 2000 BC, found at Al-Aqir near Bahla in interior Oman, included copper ingots with a large core of slags (Hauptmann 1987; Weisgerber, Yule 2003: 49). They might be an example of the defective copper ingots reported in an Old Babylonia letter from Ur (UET 5 81) as being acquired from Tilmun by a merchant named Ea-Nasir for a certain Nanni, who rejected them, around ca. 1750 BC (Oppenheim 1954: 10-11; 1967: 82-83; Bibby 1970: 188) (see Fig. 7c).

<sup>51</sup> For an overview of the so-called Localization Era of the Indus tradition, also known as Late Harappan or Post-Harappan phase (Shaffer 1992; Possehl 2002b: 29, tab. 2.2), see Lahiri 2000; Possehl 2002b; Kenoyer 2005b; 237; Wright 2012.

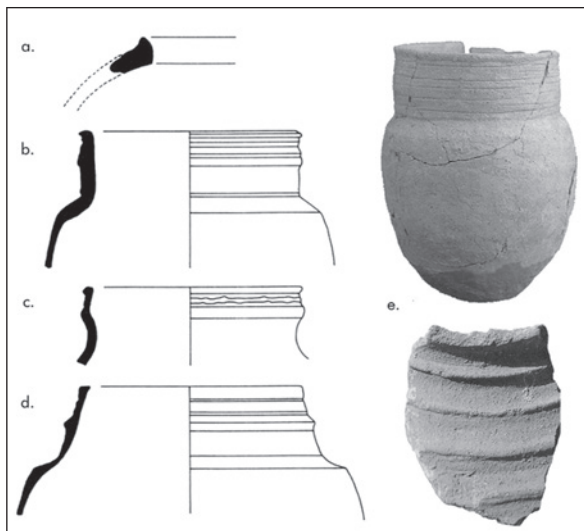


Fig. 21. Tilmun-type pottery from Wadi Suq levels: (a) Fragment of chain-ridged ware from Shimal SX-SY; (b) Tilmun funerary jar from Kalba K5; (c) Tilmun funerary jar from Munayi; (d) Tilmun funerary jar from Sur (modified after Méry et alii 2018: fig. 3); (e) Jar and sherd of Barbar red-ridged from Tell Abraq (modified after Potts D.T. 2000: 120).

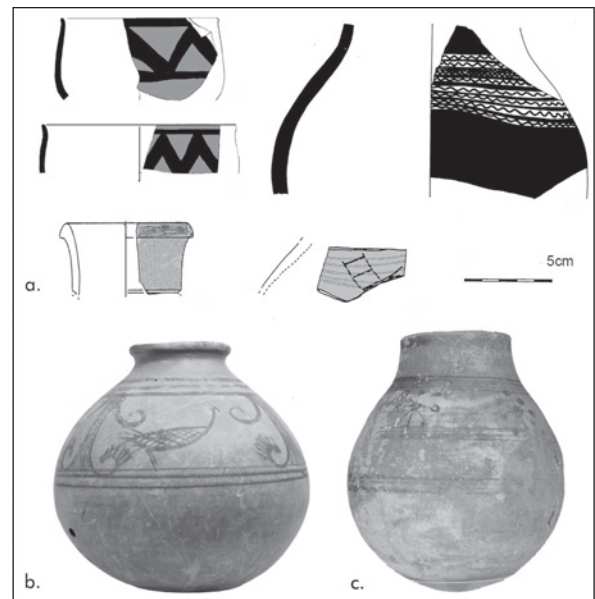


Fig. 22. Late Sorath pottery from: (a) Ras al-Jinz, Sultanate of Oman (Cleuziou, Tosi 2007: fig. 292); (b) Karzakh Cemetery, Bahrain, (c) Buri Cemetery, Bahrain (Wright 2014: figs. 5-6).

New types of post-Indus bichrome and polychrome jars from Jhukar sites in Sindh and mainly from Late Sorath Harappan sites in Gujarat have been found in contexts dating to the first half of the second millennium BC at Saar, Qalaa t al-Bahrain in Bahrain and along the northern shores of the Oman Peninsula at Tell Abraq and Shimal (Wright 2012, cf. Potts 1994; Hjelund, Andersen 1994; Carter 2001). The discovery at Ras al-Jinz (Structure 3, RJ-1 and RJ-21) of a few sherds of Sorath Harappan fine ware bowls has been interpreted as the evidence for an intensification of the exploitation of copper sources on the Masirah Island (Cleuziou, Tosi 2007: 272-273, fig. 292). However, according to R.P. Wright (2012: 110), what remains unclear is whether the Sorath Harappan ceramics (from Ras al-Jinz) represent new exchange relations or a continuation of those established in the preceding period.

In addition to ceramic containers, stone beads made from carnelian are often found in the Wadi Suq contexts, but they were most probably handed down from previous periods or were now produced from local low-quality sources (Kenoyer, Frenzel 2018a: 67). Based on their macroscopic features, O. Brunet (2009: 65 and note 13) suggested, in fact, that only ten carnelian beads of the more than two thousand found in the Wadi Suq necropolises of Shimal and Dayah, in the Ras al-Khaymah Emirate, were manufactured in the

Indus Valley or, in any case, using carnelian from Gujarat and Indus techniques. Moreover, according to A. De Waele and E. Haerinck (2006: 36), Indus-type bleached carnelian beads were absent in second millennium BC throughout the Oman Peninsula.

#### *Levantine Influences in Metal Weaponry*

In the Wadi Suq period, metal production in the Oman Peninsula was mainly dedicated to the mass production of weapons. The beginning, during the first half of the second millennium BC, of the local manufacturing of thrusting swords with double-edged triangular blades in copper was possibly inspired to the contemporaneous productions in the Levant (Lombard 1985; Potts D.T. 1998: 191-192). Socketed copper spearheads, which appeared for the first time at the end of the Umm an-Nar period, became common during the Wadi Suq period (Potts D.T. 1998: 183). Similarities with contemporaneous productions in the Near East and Southwestern Iran are evident (Potts D.T. 1990b: 252-253), but they might result from specific technical requirements rather than cultural influences. Arrowheads appeared instead at the very end of the Wadi Suq period and became widespread during the Late Bronze and mostly in the Early Iron Age, showing typological similarities with comparable productions in Northwestern Iran (Potts D.T. 1990b: 253).

*Late Bronze Age and Early Iron Age: Kassite and Neo-Assyrian periods, ca. 1600-600 BC*

After the settlement contraction and reorganization that characterised the Wadi Suq period, population patterns experienced a rapid expansion in the whole Arabian Peninsula during the Late Bronze Age (ca. 1600/1500-1300 BC) and the Early Iron Age I and II (ca. 1300-600 BC)<sup>52</sup>. Long-range exchanges flourished again after the previous Dark Age with the extension of the external trade networks, in addition to the known overseas routes, a lot in Arabia.

In the past, scholars suggested that this phenomenon was consequential to the rise of the Achaemenid Empire (538-332 BC) (Humphries 1974: 53-54)<sup>53</sup>. However, most of the new settlements were founded already during the Iron Age II (ca. 1000-600 BC) (Magee 2003: 1-10). According to P. Magee (2014: 258), «The simultaneous settlement intensification that occurs in southeastern, southwestern and northern Arabia suggests a systemic ecological adaptation to the climatic shifts that affected the Peninsula as a whole during the late second and early first millennia BC». Such a climatic deterioration led, in fact, to the introduction of an artificial irrigation system, presently known in Arabic as *falaj* (pl. *aflaj*), and to dromedary domestication. However, this new economic organisation did not affect the political and cultural configuration of the Omani society, which remained based on that tribal cohesion that had formed over the previous millennia.

*Aflaj* are networks of human-made underground tunnels and surface canals created to transport water by gravity where the presence of soil makes agriculture possible (Al-Ghafri 2004; Al-Tikriti 2011; Charbonnier 2018). Even if sev-

eral scholars proposed that this technology was developed in Iran and only later transferred to Arabia with the expansion of the Achaemenid Empire, it is now archaeologically proven that *aflaj* were already in use in Southeastern Arabia by the end of the second millennium BC<sup>54</sup>. This landmark innovation allowed a substantial increase of artificially irrigated land that led to an extensive settlement development into new territories, including the alluvial plain along the western side of the Hajar Mountains (Magee 2003; 2014: 219).

Dromedaries (*Camelus dromedarius*) were domesticated in Southeastern Arabia, either primarily or independently, as the result of a millenary process of exploitation as sources of meat, milk and wool, begun at the latest in the Hafit period (Curci, Carletti, Tosi 2014; Magee 2015: 271-272), but possibly thanks also to the exposure of local herders to a comparable domestication process occurred earlier in Baluchistan to Bactrian camels (*Camelus bactrianus*) during the second millennium BC (Meadow 1993; Potts 1993; 2004; Magee 2015: 273). Even if coastal sites continued to receive goods shipped from overseas regions, the use of dromedaries as pack animals in long-range trade allowed to move considerable amounts of goods overland, leading to the opening of a new major inland network of trade routes that crossed the Arabian Peninsula towards the Levant and the Mediterranean (Magee 2014: 204-213, 226).

For what concerns the material culture, according to D.T. Potts (1990b: 354), during this period there was a widespread and, in many respects, homogeneous culture extending from the Wadi Samad in the south to Ras al-Khaimah in the north. Iron Age II pottery assemblages included almost exclusively local productions (Magee 2014: 222, figs. 8.6-7), but a distinctive bridge-spouted vessel of Iranian inspiration, either made locally or imported from Southwestern Iran, is frequently found (Magee 2011: 213-227). Copper was no longer shipped to Mesopotamia but processed at large proto-industrial sites along the eastern fringes of the Rub al-Khali desert, such as those recently excavated at Uqdat al-Bakrah in Oman and Saruq al-Hadid in the Dubai Emirate. Both sites revealed the existence of an extensive network of long-range exchanges and influences with the major poles of Assyrian, Urartian and Elamite metallurgical activities (Yule, Gernez 2016; Potts 2009: 3-9; Weeks *et alii* 2017; 2018; 2019). The

<sup>52</sup> Iron is not attested in Southeastern Arabia before the Seleucid era (312-63 BC) and the use of the term Iron Age for this region is due to an attempt of chronological synchronization with the cultural periodisation previously established for Iran (Potts 1990b: 354-55; Yule 2014: 15-17).

<sup>53</sup> After the disappearance of Makkan in the Mesopotamian written sources during the first centuries of the second millennium BC, there was no written mention of the Oman Peninsula until the Early Iron Age. Different names were used instead to designate Southeastern Arabia in the first millennium BC (Yule 2014: 17 ff.; Potts 1990b: 393-398), such as *Qadē* in the Late Babylonian, Late- and Neo-Assyrian, and Achaemenid texts, and *Maka* in late Achaemenid sculpture and texts, which corresponded both to the same province of the Achaemenid empire including Southeastern Arabia and the southwestern shores of Iran.

<sup>54</sup> Al-Tikriti 2002; Orchard, Orchard 2007; Avanzini, Phillips 2010: 93-108; Charbonnier 2014.

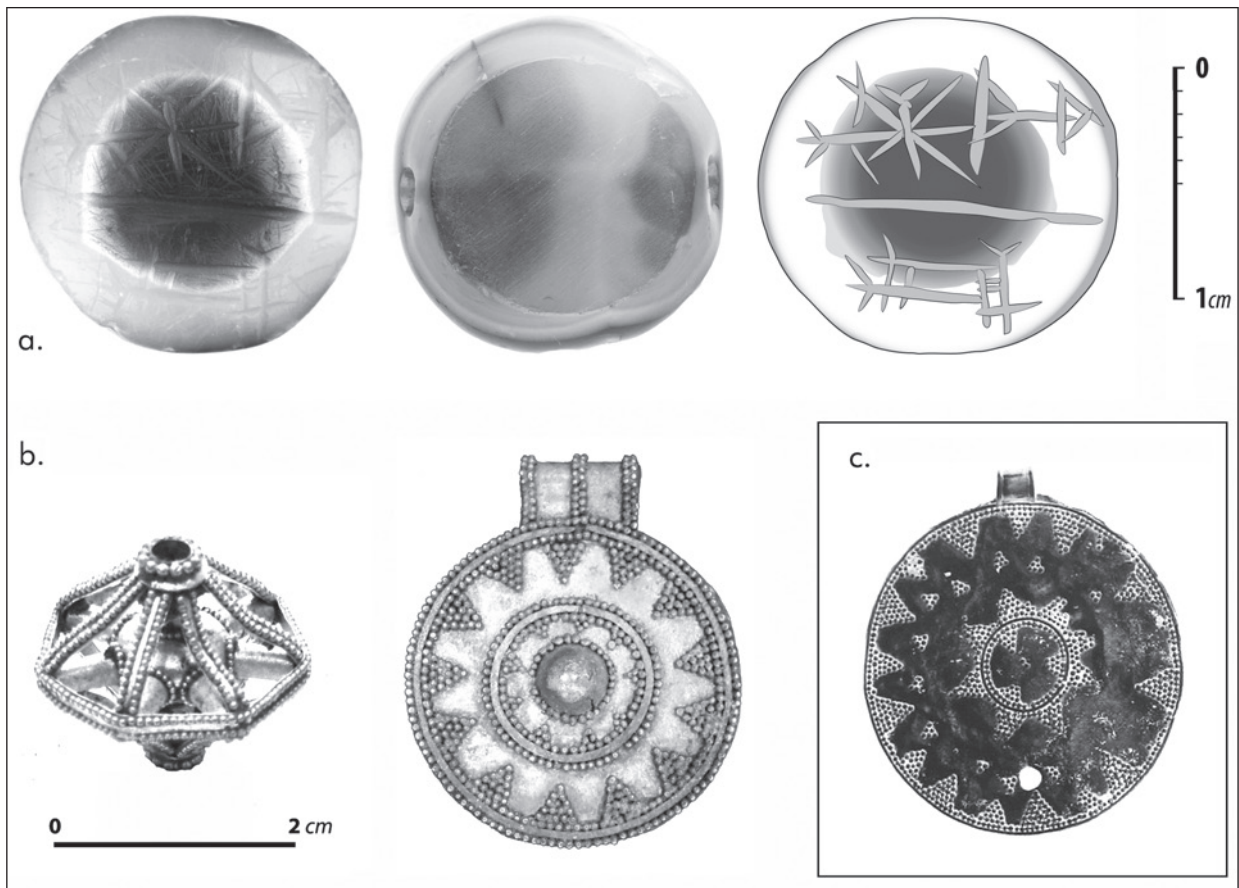


Fig. 23. Dibba al-Bayah (Sultanate of Oman): (a) Kassite eye-stone dedicated to Gula, the Mesopotamian healing deity and patroness of doctors, presently the southernmost cuneiform inscription ever discovered (photographs and drawing by M.P. Maiorano); (b) Wheel-shape granulated gold bead and granulated gold pendant (photographs by F.G enchi); (c) Granulated gold pendant from the northwestern part of the Oman Peninsula (Negahban 1996: p. 154/184).

existence of an extended network of long-distance exchanges is confirmed by the discovery of a large and diversified assemblage of imported objects in the contemporaneous funerary structures (for examples, see Ghenchi *et al.* 2018) (Fig. 23).

*Cross-cultural trade and socio-technical developments in the Oman Peninsula*

The nomadic and sedentary communities that occupied the Oman Peninsula during the seven millennia from the Neolithic to the beginning of the Iron Age have been involved in an extensive and differentiated range of long-distance and cosmopolitan interactions. This long-term trend has resulted in a rather discontinuous trajectory that included periods of intensive cultural and economic exchanges alternated with phases characterised by an internal reaction, which eventually led to the assimilation and elaboration in original

forms of previous allochthonous inputs. Considering the unique ecologic, climatic and geologic characteristics of this region, external contributions and demands often stimulated the development and consolidation of fundamental socio-technical spheres, with positive returns also on the cultural and economic setting of the local society.

The Early Neolithic period witnessed the occasional arrival of small groups of herders from the Levant, who substantially contributed to the process of animal domestication in southern Arabia and likely transferred also new stone knapping techniques and lithic technologies. During the sixth and fifth millennia BC, the Middle Neolithic communities of Southeastern Arabia started interacting with Ubaid merchants from southern Mesopotamia. The acquisition and use of Ubaid ceramic containers eventually led to the earliest appearance of local handmade coarse pottery at a few coastal sites in Saudi Arabia and Kuwait. The Late Neolithic is marked by the beginning of cop-

per production in the Oman Peninsula, which was likely fostered by a significant request from Mesopotamian merchants venturing down the Gulf in search of valuable raw materials.

Interactions between the Oman Peninsula and southern Mesopotamia intensified at the beginning of the Early Bronze Age. In the Hafit period (ca. 3200-2700 BC), the increasing demand for metals in Mesopotamia and the consequent affluence of valuable goods and new cultivars into Southeastern Arabia favoured the emergence of a unique socio-economic and cultural setting based on tribal alliance and kinship bonds, sustained by an incipient form of irrigated oasis farming. Even in presence of discontinuous archaeological data, the availability in the last centuries of the third millennium BC of a substantial number of written cuneiform sources from Akkadian royal inscriptions and Ur III economic texts allowed a rather detailed understanding of long-range exchanges and foreign interactions during the second phase of the Early Bronze Age in the Oman Peninsula, equal to the Umm an-Nar period (ca. 2800-2000 BC). In this period, the role of Makkan, i.e. the Oman Peninsula in the cuneiform texts, in organising long-range trade with the neighbouring regions and polities varied considerably mainly according to the global political and economic scenario (Fig 24).

The export of Omani copper to Mesopotamia increased to cover more than half of the analysed objects, while imports were gradually reduced to be eventually limited to a few, specific technical spheres. Commercial and cultural interactions with southern Iran led instead to the local development of an extensive pottery production but remained, however, restricted almost exclusively to the importation of fine grey ware ceramics used as symbols of high social status during funerary rituals. The second half of the third millennium BC was marked by intensive contacts between the Umm an-Nar communities and seafaring merchants from the greater Indus Valley, who regularly visited some sites along the coast of central Oman according to the seasonal monsoon sailing routes. However, recent discoveries proved that small groups of merchants and craftspeople from the Indus Valley were also settled with their families in the interior of the Oman Peninsula, most likely to interact directly with the socio-economic entities that controlled the extraction and first processing of copper minerals and prized metamorphic rocks.

At the opening of the second millennium BC, the Oman Peninsula witnessed a substantial socio-cultural and economic reorganisation during the

so-called Wadi Suq period (ca. 2000-1600/1500 BC), which was characterised by an abrupt break in supraregional interactions. Far from being the involuntary consequence of political breakdowns in the regions traditionally involved in trading with the Umm an-Nar communities, this new trend in the Wadi Suq period was probably due to a conscious internal reaction to reaffirm the egalitarian values at the basis of the tribal society against a growing social differentiation and political centralisation created by the affluence accumulated from long-distance trade during the previous period. This tendency towards isolation was suddenly inverted during the formative phases of the Iron Age (ca. 1300-600 BC), mainly in consequence of the introduction of two momentous technological innovations: a system of extensive artificial irrigation presently known in the region as *falaj* (pl. *aflaj*), and the local domestication of camel (*Camelus dromedarius*). The expansion of artificially irrigated territories resulted in a massive settlement development, while – even if the coastal regions continued to receive goods shipped from overseas – the use of dromedaries allowed opening new inland trade routes across the Arabian Peninsula that reached up to the Levant and the Mediterranean.

#### *A flywheel of knowledge and wealth?*

Even if referred to a much later period and a much larger area, the fascinating sentences written by Charles H. Parker to describe the complex global interactions established in the Early Modern Age, contained all those points that, even if in an embryonic form, characterised the cross-cultural exchanges occurred across the shores of the Arabian Sea during the Bronze Age.

¶ The emergence of powerful empires set in motion [É] new commercial exchange networks, large-scale migration streams, worldwide biological exchanges, and transfers of knowledge across oceans and continents. This was a period in world history characterized by intense cultural, political, military, and economic contacts, yet all this interaction was not the story of one region dominating all the rest. Rather a host of individuals, companies, tribes, states, and empires clashed and competed but also cooperated with one another, bringing regions of the world into sustained contact and leading ultimately to the integration of global pace. (Parker C.H. 2010:3) .

Once again, Bronze Age Middle Asia has proven to have been the set for the earliest mani-

	Indus	Makkan	Tilmun	Babylonia	
3100-2700	↔	↔	↔	↔	Jamdat Nasr- Early Dynastic I
2600	↔	↔	↔	↔	Early Dynastic II
2400-2300	↔	↔	↔	↔	Early Dynastic III
2200	↔	↔	↔	↔	End of Early Dynastic
2150-2100	↔	↔	↔	↔	Middle Agade
2050	↔	↔	↔	↔	End of Agade
2018-1930	↔	↔	↔	↔	Early-Middle Ur III
1911	↔	↔	↔	↔	End of Ur III
1900-1650	↔	↔	↔	↔	Isin-Larsa/Old Babylonian

Fig. 24. Evolution of trade segmentation between the major regions involved in seafaring exchanges across the Gulf and the Arabian Sea during the Early Bronze Age (Reade 2008: fig. 3).

festation of some of the most complex and founding phenomena in human history, including the first experimentation of intense and structured long-range global trade based on cosmopolitan interactions. In this scenario, the nomadic and sedentary communities of the Oman Peninsula have consistently played a pivotal role, not only thanks to the central position of their homeland, but also to their capacity of constructively receiving external inputs and re-elaborate them into original forms of socio-economic, political and cultural organisation. As the late Maurizio Tosi used to say, Arabs were able to turn a harsh environment into a heaven of wealth using an egalitarian socio-political organisation rather than a proto-capitalistic model because they dreamed different dreams .

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