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# Bronze Age Salūt (ST1) and the Indus Civilization: recent discoveries and new insights on regional interaction

DENNYS FRENEZ, MICHELE DEGLI ESPOSTI, SOPHIE MÉRY & JONATHAN MARK KENOYER

## Summary

This study focuses on the nature of interactions and trade between the greater Indus Valley and eastern Arabia during the third millennium BC. The role of Indus trade in eastern Arabia has often been discussed in the general picture of local cultural and economic developments during the Bronze Age, but the organization and mechanism of this important phenomenon are not yet precisely decoded. New evidence from the stone tower ST1 excavated at Salūt, Sultanate of Oman, by the Italian Mission to Oman in collaboration with the Office of the Adviser to His Majesty the Sultan for Cultural Affairs, provided solid information for proposing updated models of transcultural economic interaction. The collection of Indus and Indus-related artefacts from ST1 testifies to an early integration of sites located in the interior of central Oman, within the network of long-distance connections that directly linked the Indus regions with the western shores of the Arabian Sea. The presence of a wide range of Indus pottery types, including utilitarian pottery and specific forms used for food production and presentation, suggests that some degree of cultural interaction occurred along with the expansion of trade. The discovery of Indus seals and carnelian beads possibly manufactured with non-Indus raw materials further supports the hypothesis that merchants and craftsmen from the Indus Valley were living and working in interior Oman during the second half of the third millennium BC. The evidence from ST1 also provides support for similar discoveries from other excavations in Oman and the UAE, suggesting that the interaction between Indus communities and eastern Arabia was much more extensive than previously thought.

**Keywords:** Oman, Indus Civilization, pottery, beads, seals

## Introduction

The nature of interactions and trade between the Indus Civilization and eastern Arabia has been the focus of considerable research, particularly since the 1970s (for summaries see Cleuziou & Tosi 2007; Laursen 2010; Potts 2012; Weeks 2014; Frenez, in press). While there have been important contributions to general models of interaction between these regions, recent excavations of the third-millennium levels at the stone tower ST1 at Salūt, Sultanate of Oman, have revealed the presence of pottery, seals, sealings, beads, and other artefacts that provide new perspectives on the complex nature of Indus and Oman linkages. As will be discussed in more detail later on, some of these objects indicate the possible presence of Indus individuals or communities in the interior of central Oman during the second half of the third millennium BC. This evidence provides support for similar discoveries from excavations of towers and graves in Bāt, and suggests that the interaction between Indus communities and the Omani interior was much more extensive than previously thought.

## Prehistoric developments in the Indus Valley and eastern Arabia

The Indus (or Harappan) Civilization of present-day Pakistan and north-western India (*c.*2600–1900 BC) was acknowledged almost a century ago as a distinct cultural complex contemporaneous with other state-level urban civilizations in Mesopotamia and Egypt (Lahiri 2006; Marshall 1924). Although the Indus script is still undeciphered, multidisciplinary research has resulted in important advances in our understanding of Indus chronology (Fig. 1), regional variations in material culture, subsistence and socio-economic, political, and ideological organization (Kenoyer 2014; Possehl 2002; Wright 2010).

Interactions with other urban cultures of Middle Asia had a central role in research on the Indus Civilization since its very beginning. The prehistoric dating of this cultural complex was first proposed on the basis of parallels between the inscribed seals that were coming to light at Harappa and Mohenjo-Daro and those found earlier at sites in Mesopotamia (Gadd 1932; Mackay

INDUS TRADITION	OMAN PENINSULA	MESOPOTAMIA
	<i>Iron Age II</i> 600 BC 1000 BC	<i>Late Assyrian</i> 612 BC 911 BC
<b>LOCALIZATION ERA</b>	<i>Iron Age I</i> 1100 BC 1300 BC	<i>Middle Assyrian</i> 1076 BC <i>Middle Babylonian</i> 1363 BC
<i>Late Harappa Phase</i> 1300 BC 1900 BC	<i>Wadi Suq Period</i> 1300 BC 2000 BC	<i>Isin-Larsa</i> 1736 BC <i>Dynasties</i> 2025 BC
<b>INTEGRATION ERA</b>		
<i>Harappa Phase</i> 1900 BC 2600 BC	<i>Umm an-Nar Period</i> 2000 BC 2700 BC	<i>Ur III Period</i> 2004 BC 2112 BC <i>Akkadian Period</i> 2193 BC 2334 BC <i>Early Dynastic Period</i> 2334 BC 2900 BC
<b>REGIONALIZATION ERA</b>		
<i>Early Harappa Phase</i> 2600 BC 5500 BC	<i>Hafit Period</i> 2700 BC 3200 BC	<i>Jemdet Nasr Period</i> 2900 BC 3100 BC <i>Uruk Period</i> 3100 BC 4100 BC
<b>EARLY FOOD PRODUCING ERA</b>		
<i>Mehrgarh Phase</i> 5500 BC +7000 BC	<i>Foraging-Agro/Pastoral</i> 3200 BC 6000 BC	<i>Ubaid Period</i> 4000 BC 5500 BC

FIGURE 1. Chronology of the Indus Civilization (Kenoyer 2015: table 2), the Oman peninsula (Cleuziou & Tosi 2007), and Mesopotamia (Stein 2001: fig. 2).

1925). Moreover, R.E.M. Wheeler interpreted the Indus Civilization as a secondary urban phenomenon deeply influenced by the city-states of Sumer (Wheeler 1968: 25, 135).

The Indus Civilization emerged in response to local adaptive processes beginning in the Neolithic period, c.7000 BC (Mehrgarh Phase, Early Food Producing Era) (Kenoyer 1991; Shaffer 1992), and the subsequent Chalcolithic period, c.5500–2600 BC (Regionalization Era) (Kenoyer 1991; Shaffer 1992). During these periods settled agro-pastoral and coastal fishing communities were established throughout the regions of Balochistan and the Indus and Ghaggar-Hakra river valleys. Overland and riverine trade networks connected inland settlements to coastal regions and more distant resource areas.

Marine shells found in the Neolithic burials of Mehrgarh in Balochistan, such as *Pinctada* sp. and *Engina mendicaria*, probably originated from the Makran coast (Kenoyer 1995), but they may also have come from the coastal regions of eastern Arabia.

During these formative phases there is discontinuous evidence of a limited amount of long-distance trade and interaction between communities in the Indus Valley and other regions, such as south-eastern Iran, Central Asia, and Mesopotamia (Cortesi et al. 2008; Frenez, in press; Kenoyer 2008). By the second half of the third millennium BC, however, during the so-called Indus Integration Era traders and elites from the Indus region became more directly involved in defining and promoting trade with a wide range of communities across the whole

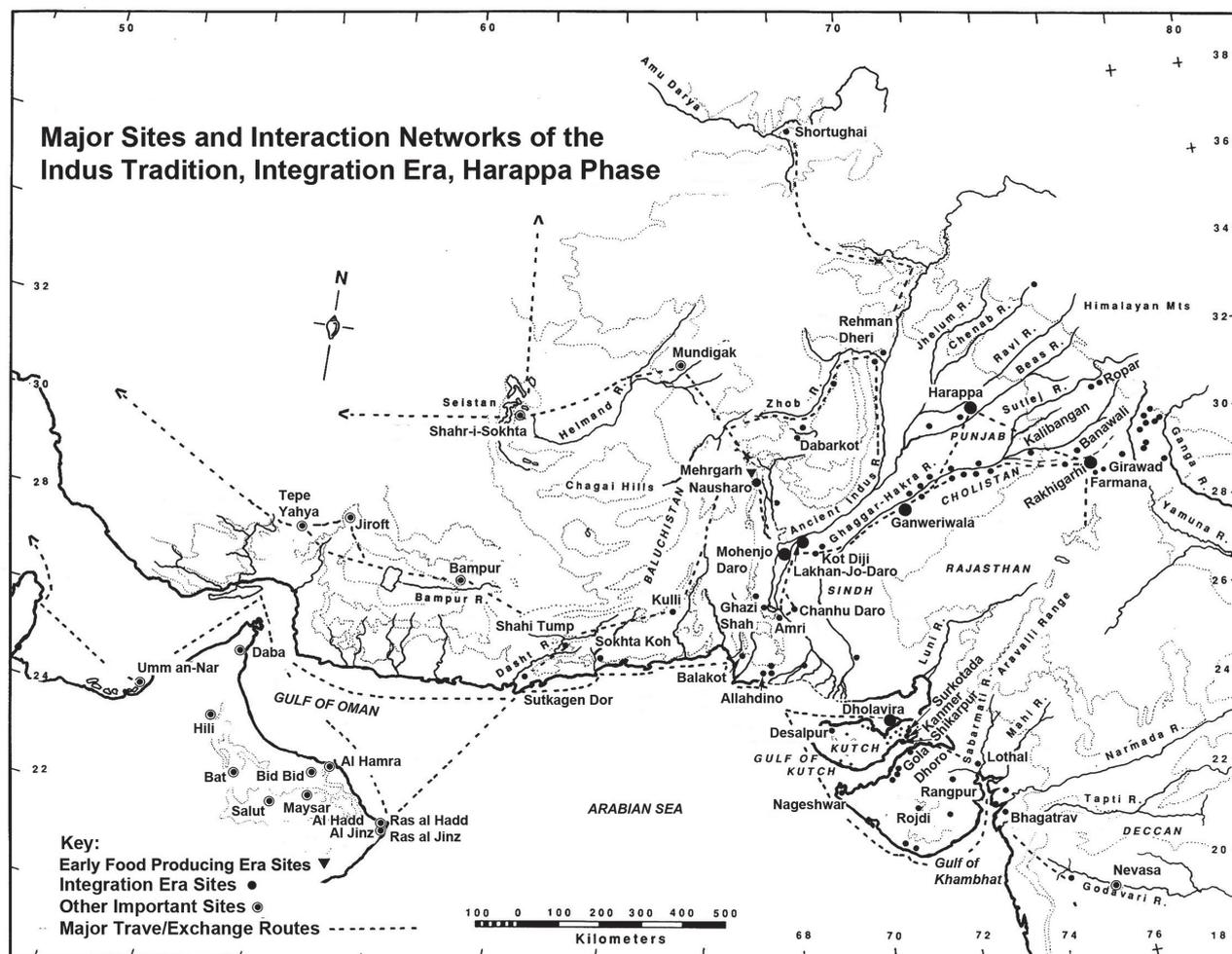


FIGURE 2. Major sites and interaction networks of the Indus tradition, Integration Era, Harappa phase.

of Middle Asia (Fig. 2) (Chakrabarti 1990; Frenze 2011; Possehl 1996; Ratnagar 2004; Tosi 1991), including eastern Arabia and the Oman peninsula (Blackman & Méry 1999; Cleuziou & Méry 2002; Cleuziou & Tosi 2000; Méry 2000; Méry & Blackman 2005; Vogt 1996; Frenze, in press).

The emergence of Bronze Age cultures in eastern Arabia (present-day United Arab Emirates and Sultanate of Oman) can also be traced back to the local Neolithic societies that developed various types of interaction networks across the Arabian Peninsula and with neighbouring regions (Cleuziou & Méry 2002; Cleuziou & Tosi 2007; Méry 2015; Méry & Charpentier 2013). The presence of ‘Ubad pottery from southern Iraq in coastal

UAE shell-middens as early as the sixth millennium BC shows that these communities were already linked to the Mesopotamian interaction sphere (Méry & Schneider 1996; Uerpmann & Uerpmann 2007). During the fourth millennium BC interaction reached south-eastern Iran (Méry 2000), and by the third millennium BC exchanges with the Indus region were well established (Edens 1993; Frenze, in press).

In the Bronze Age, during the Hafit and Umm an-Nar periods (see Fig. 1), the so-called Magan Civilization — after the name used for the Oman peninsula in cuneiform texts of Mesopotamia — characterized both coastal and inland regions of eastern Arabia (for a detailed overview of the studies about the ‘Magan’ toponym, see Glassner

1989; 1996; 2002). Early forms of oasis economy were established introducing date palms and other foreign cultivars, the metallurgy of copper and its alloys was further developed, and stone and mud-brick architecture were used to create stable settlements, massive towers, and thousands of monumental stone cairns. The Magan Civilization did not attain the level of urbanism or a state-level society as seen in Mesopotamia, Iran, and the Indus Valley, but developed an original form of socio-cultural and economic organization probably based, according to the present state of archaeological research, on kinship and tribal alliances (Cleuziou & Tosi 2007: 111–132, 157; Bortolini & Tosi 2011; Tosi 2015).

### Stone Tower ST1, Salūt (Sultanate of Oman)

In 2010 the Italian Mission to Oman of the University of Pisa, in collaboration with the Office of the Adviser to His Majesty the Sultan for Cultural Affairs, started the excavation of a circular stone tower (ST1) dating to the second half of the third millennium BC (*c.*2400–2000 BC). The Bronze Age tower is located close to the Iron Age site of Salūt in the interior of Central Oman (see Fig. 2). The circular stone tower was 22 m in diameter and had

a central stone-lined well, but no other structures were preserved on the tower itself (Fig. 3). A large ditch, 11 to 13 m wide and up to 3 m deep, surrounded the tower and two additional channels were connected to the main ditch. Together, these features appear to be related to water management and storage, possibly associated with intensive agriculture as well as providing water to the people settled around ST1 (Degli Esposti 2013; 2016).

In a late phase of the tower's occupation, waterborne sediments gradually filled the main ditch, which eventually became used as a dumping area. A small charred branch collected from SU55 provided a date for the final phase of the Bronze Age occupation: calibrated 2460–2145 BC (2-sigma 95%) or (2345–2200 1-sigma 68%) (Lab Code: 14Fi2250/14Fi2255/14 Fi2258, 3830 ± 35 years BP, OxCal 4.0, IntCal09). This date range fits well with the types of local pottery and other artefacts recovered in the nearby stratigraphic levels (SU89) (Fig. 3). As will be discussed below, these levels also contained Indus pottery and a range of other artefacts that can be linked to the Indus Civilization. All these artefacts are undergoing detailed scientific analysis and comparative study to reconstruct where they may have been made and how they came to be used and discarded at the site.

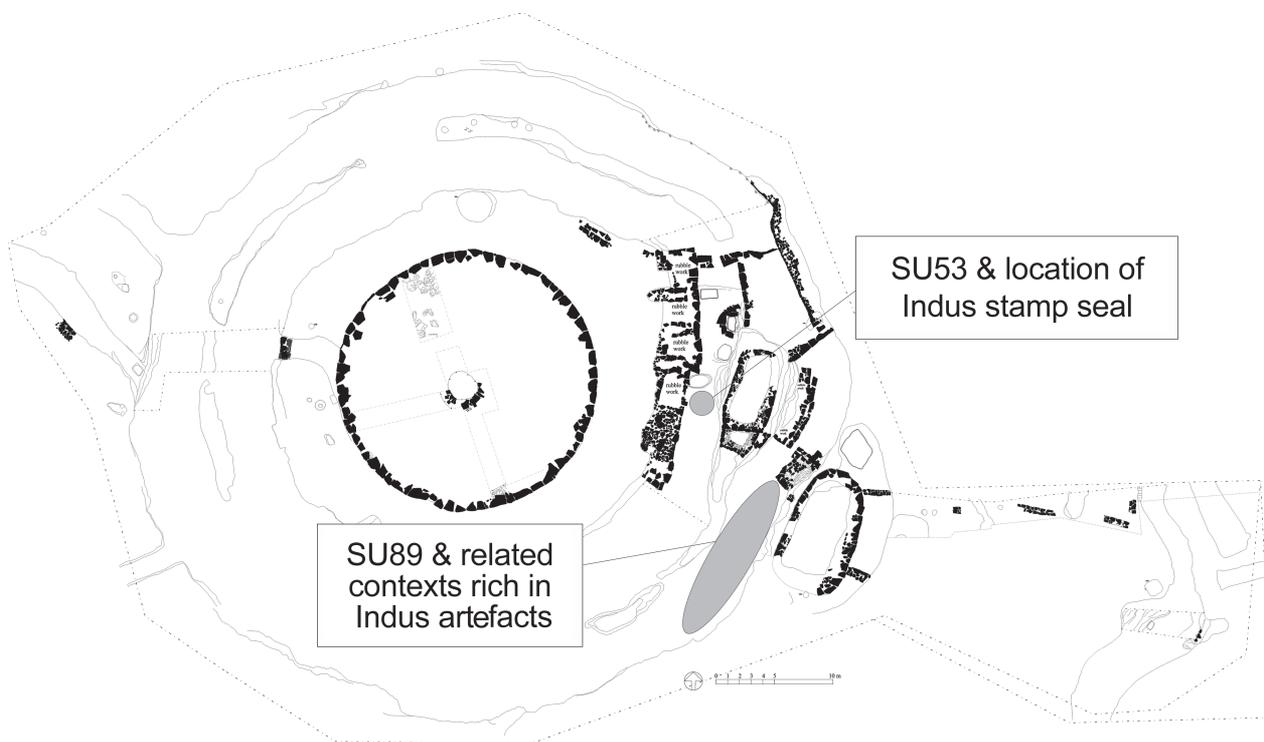
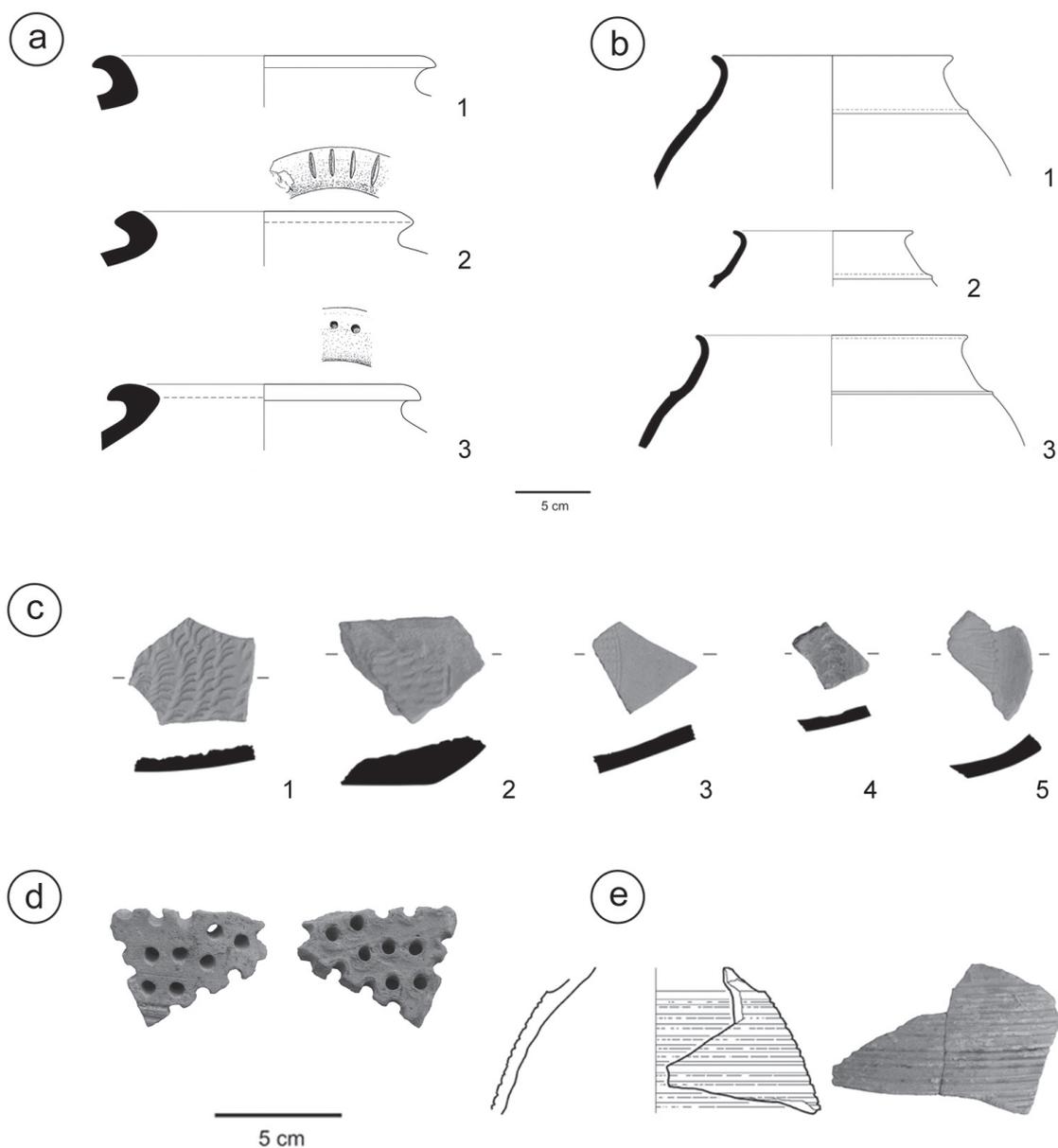


FIGURE 3. Salūt ST1: a plan of the tower and the location of the major finds discussed in the text.

**Indus Pottery at ST1**

Indus pottery sherds are relatively numerous at ST1 and testify to the presence of both utilitarian and specialized types used for storage and trading, food processing, and presentation. The total percentage of Indus sherds

in relation to local pottery is still being calculated, but some areas of the excavations had higher concentrations than others, suggesting that people who used Indus-type pottery may have been living or at least dumping their pottery in specific areas near the main central tower itself (see Fig. 3).



**FIGURE 4.** *Salūt ST1, Indus-related pottery: a. black-slipped jar, rim sherds; b. ridged cooking pot rim and body fragments; c. dish-on-stand, impressed plate fragments; d. perforated jar fragment; e. ledge-shouldered jar with grooved exterior, body sherd.*

The discovery of rim and body sherds of the large Indus black-slipped jars is not surprising as this form has been reported from numerous sites along the coasts of Oman and the UAE, as well as from inland settlements (Méry & Blackman 2005). These vessels have a distinctive curvilinear profile and thick layers of blackish to brown-purplish slip completely coating their internal and external surfaces, suggesting that they were used to store foodstuffs and liquids in non-porous conditions. The black-slipped jar rim sherds from ST1 (Fig. 4/a) range between 19 and 22 cm in external rim diameter, which is similar to the mean external rim diameter (21.29 cm) reconstructed for the black-slipped jars from Mohenjo-Daro (Dales & Kenoyer 1986: 84), and comparable to a complete vessel from Harappa that had an external rim diameter of *c.*22 cm and was 70 cm high and 57 cm wide for an estimated capacity of 84 litres (Kenoyer 1998: 231, cat. no. 177). One of the specimens from ST1 (Figure 4/a.2) has four post-firing incised lines on the rim, while another sherd (Fig. 4/a.3) has two post-firing holes drilled into the rim. Post-firing linear incisions are attested on similar jars found in the Indus region and indicate that the ST1 vessels were being marked by people who used notations similar to the forms used in the Indus Valley. Drilled holes are not reported on Indus rims but are seen on some of the local pottery, which suggests that at least some of the jars were marked once they reached eastern Arabia.

The other Indus pottery forms found at ST1 were not used for shipping goods, but appear to have been used for domestic activities such as cooking (Fig. 4/b) and processing foods, serving and presenting prepared foods (Fig. 4/c), or storing small amounts of food or other items. Some elaborately painted vessels (Fig. 5) may also have been used for special ritual activities or as indicators of ethnic identity (Kenoyer 2000: 103–104).

Excavations at ST1 provided evidence of Indus-style cooking vessels. These vessels, with flaring rim, ridged shoulder, and rounded bottom, are diagnostic of Indus culture and first appear during the early Harappan Period around 2800 BC (Kenoyer 1998: 155). They became widespread during the urban Harappa Phase (2600–1900 BC) and are found at all Indus sites, from Shortughai in northern Afghanistan (Francfort 1989: fig. 38/20–26) to small village settlements in Gujarat (Lindstrom 2013: 269). Fragments of Indus cooking pots have also been identified at Bāt (Thornton 2013: 610, fig. 31/6b) and at Ra's al-Ḥadd HD-1 (Cleuziou & Méry 2002: fig 5/i, Méry 2000: 236, fig. 144/6). The presence of characteristic Indus cooking pots most likely indicates that there were Indus individuals or communities who wanted to cook

food in Indus-style vessels to follow their traditional culinary habits. Petrographic studies of the ST1 cooking pots are in process, but one sherd looks like it was made of local clay. If local production of Indus cooking pots is confirmed, then this would indicate a second type of Indus vessel being made locally (see dish-on-stand discussion below).

Another typical Indus form related to food preparation documented at ST1 is the tall cylindrical perforated jar (Fig. 4/d). These types of jars are found at most Indus sites (Dales & Kenoyer 1986: 107–109) and are thought to have been used as a form of reverse strainer for preparing some sort of fermented drink (Kenoyer 1998: 154, fig. 8/7). The discovery of these sherds at ST1 would indicate that some individuals or communities at the site were preparing Indus-style drinks with these specialized perforated vessels. Indus-style perforated vessel sherds have also been reported from Ra's al-Jinz RJ-2 (Cleuziou & Méry 2002: fig. 5/g; Méry 2000: 236, fig. 147).

One important category of serving vessel is a unique Indus form that includes both tall and short pedestalled dishes or bowls, commonly referred to as 'dish-on-stand' (Dales & Kenoyer 1986: 212–221). These vessels appear to have been important serving vessels used in the home or for special functions, and were also commonly included along with other containers in Indus burial offerings (Kenoyer 1998: 154). The pedestalled dishes found at ST1 were decorated on the interior with impressed designs identical to those found on many other examples of Indus vessels (Fig. 4/c). In addition to presentation, the rough impressed surfaces of the Indus pedestalled dishes may have functioned as an abrasive surface for grating hard cheese (Gouin 1990) or crushing herbs. Regardless of what they were used for, Indus-style pedestalled and impressed dishes were clearly important for some groups of people living at ST1 and other sites in eastern Arabia. Similar Indus pedestalled dishes with impressed designs have been found at both inland and coastal sites of the Oman peninsula (Méry 2000: 236, fig. 144/1–2). Some specimens found in excavations on Maṣīrah Island (Charpentier et al. 2013: 93–95, fig. 7/7) represent the southernmost location where Indus artefacts have been discovered so far. Examples of Indus-style pedestalled dishes from both Hili-8 and Bāt appear to have been manufactured from local clay (Méry 2000: 238, figs 145–146).

One other example of Indus pottery found at ST1 is a grooved sherd (Fig. 4/e), the surface treatment and shape of which are diagnostic of the Kot Diji-style ceramics dating to the early Harappan phase in the Indus Valley,



FIGURE 5. Salūt ST1: large globular jar with red slip and black-painted Indus motifs.

c.2800 to 2600 BC (Meadow & Kenoyer 2008: 94, fig 6; Halim 1972: fig. 18/a). The discovery of a Kot Dijian sherd at ST1 might suggest the presence of an earlier occupation in the area of Salūt that predated the building of the stone tower. If confirmed through future excavations, this would indicate that links between the Indus region and the Oman peninsula were established earlier than previously thought. Kot Diji-type vessels, however, are occasionally found at Indus sites in contexts dating until c.2450 BC. In any case, this sherd indicates that items from the Indus Valley reached the area of Salūt at least from the time of the foundation of ST1, c.2400 BC.

Fragments of both small and large globular jars with diagnostic Indus motifs painted in black on a red slip (Dales & Kenoyer 1986: 47–53, figs G and H) have also been found at ST1. The elaborate decorations on one large vessel from ST1 include intersecting circle motifs, peacocks, and pipal leaves in different registers divided by a series of horizontal lines (see Fig. 5). Similar combinations of designs are found on a very small percentage of painted pottery at Indus sites and are thought to represent very special types of decorative or ritual vessels. In South Asia heavily decorated pottery vessels are traditionally used at weddings as auspicious marriage gifts (Kenoyer 1998: 109) or are prepared for special rituals. Jars and pots with Indus black-on-red painted decorations have been found at several other sites in the Oman peninsula (Méry 2000: 238–243, figs 148–152).

#### Pottery disc

One last pottery fragment that is worthy of discussion is a sherd that was chipped to make a circular disc (Fig. 6). This disc was made from a globular vessel with a red slip and horizontal black bands, similar to the large jar discussed above (see Fig. 5). Similar pottery discs made in graduated sizes are common at Indus sites and are thought to have been used as counters or stacked on top of each other in a game that is still played by children in Pakistan and northern India (Kenoyer 1998: 132). At the site of Harappa, more than 1000 pottery discs of this type have been recovered from excavations carried out by the Harappa Archaeological Research Project between 1986 and 2001. Such discs have not been reported from sites in the Oman peninsula in the past and since this disc was made on what appears to be an Indus-style sherd, it is possible that it represents a game played by someone from the Indus region, possibly even a child.

#### Terracotta toy

ST1 has revealed the presence of a hollow Indus bird figurine fragment that was painted on the exterior with black slip (Fig. 7). Tiny holes are perforated in the neck and beak. The Indus figurine corpus includes many hollow wheeled specimens, some of which are painted with red or black slip (Clark 2007: app. F). The holes



FIGURE 6. *Salūt ST1: pottery disc with red slip and black horizontal bands.*

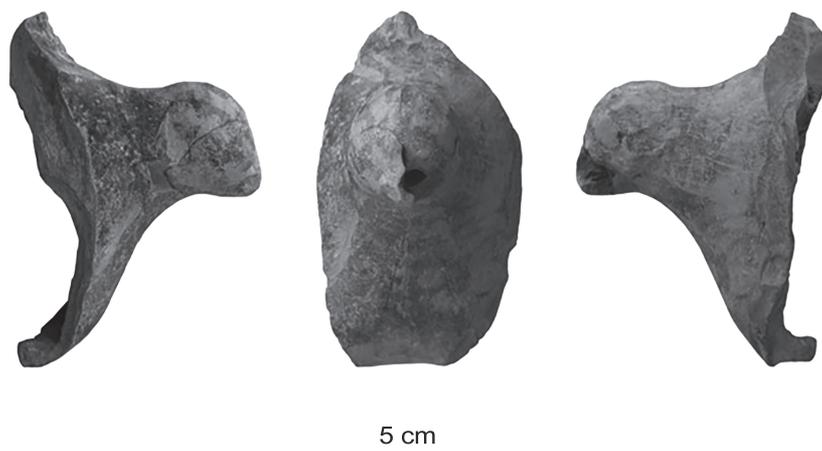


FIGURE 7. *Salūt ST1: hollow terracotta bird figurine with black slip.*

in the head appear to have been for attaching a thread used to pull the figurine along on its wheels (Kenoyer 1998: 133, fig. 7/19). Some hollow figurines were also used as whistles. The black paint may indicate that it was supposed to represent a black partridge, which is known to have a shrill whistling call. No other examples of this type of hollow figurine have ever been reported from sites in the Oman peninsula and it clearly reflects a distinctive Indus cultural tradition that was being practised at ST1. Petrographic analysis of the clay is needed to determine if the object was made in the Indus or if it was made from local clay to replicate an Indus form.

#### ***Carnelian beads***

Large fragments of three, almost identical, long biconical Indus-style beads made from a deep red-orange carnelian were found at ST1 (Fig. 8). These beads are not the extremely long variety of Indus biconical beads, but a shorter variety that is common at all major Indus sites. In addition to the basic shape and fine exterior polish, which are typical of Indus craftsmanship, a study of the beads perforation indicates that they were drilled using a distinctive Indus-style constricted cylindrical drill invented by bead makers in the Indus Valley around 2600

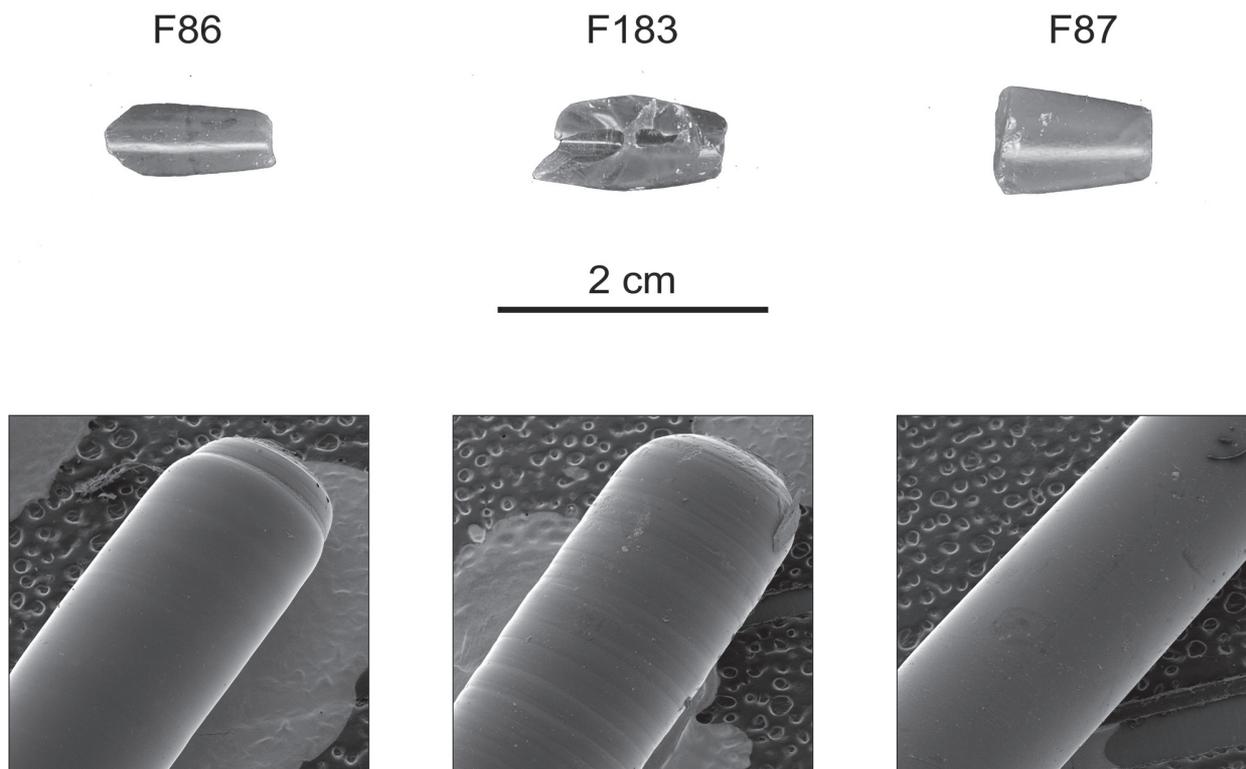


FIGURE 8. *Salūt ST1: carnelian beads and SEM images of drill-hole impressions.*

or 2500 BC to perforate hard stones like carnelian and jasper (Kenoyer & Vidale 1992). These drills were made from a unique rock called ‘*ernestite*’, which is harder than carnelian and was obtained from some unknown area of the Indus region, either Balochistan or Gujarat (Law 2011; Prabhakar et al. 2012). The tip of the ‘*ernestite*’ drills was wider than the shaft and their use produced highly polished drill holes with a straight cylindrical profile. The scanning electron microscope (SEM) analysis of the drill hole impressions confirmed that the beads found at ST1 were manufactured using Indus constricted cylindrical drills in ‘*ernestite*’ (Fig. 8). In the Oman peninsula, Kenoyer and Frenez have identified carnelian beads perforated with constricted cylindrical drills at Bāt (Böhme & Ali Al-Sabri 2011: 149 and fig. 22/158; Döpfer & Schmidt 2014: fig. 6/e and 11/f), as well as at other sites and in collections that have yet to be published.

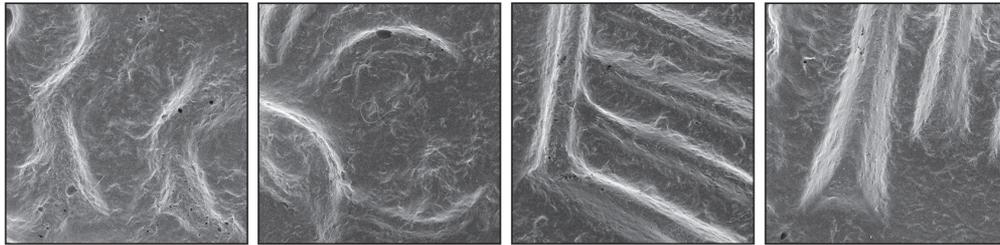
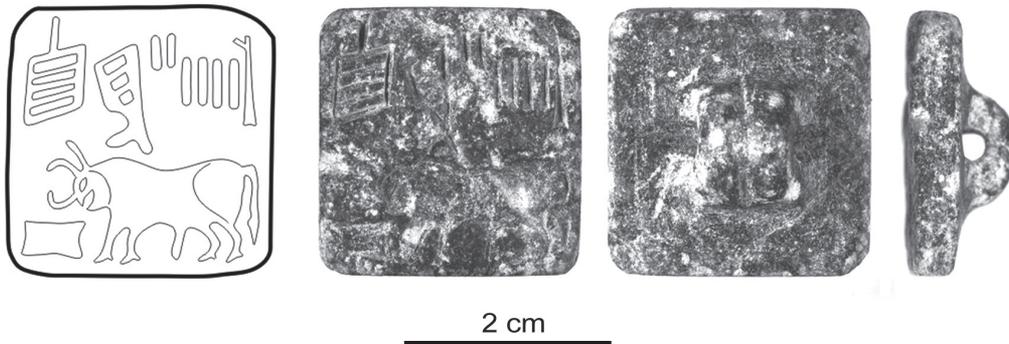
The deep red-orange colour of the carnelian beads from ST1 is visually identical to the best quality carnelian found in Gujarat, India, which was the main source of carnelian

for the Indus Civilization. Since Yemen was also famous for its deep red-orange carnelian, however, tiny chips of the broken carnelian beads from ST1 were analysed by Dr Laure Dussubieux at the Elemental Analysis Facility (The Field Museum, Chicago), using Laser Ablation Inductively Coupled Plasma Mass Spectrometry (for the use of LA-ICP-MS to determine the source of carnelian, see Carter 2013; Law et al. 2013). The chemical signatures of these beads were compared to carnelian and agate raw materials from other potential source areas in Gujarat, Baluchistan, Afghanistan, Iran, Egypt, Yemen, and Oman. The results calculated by Dr Randall Law, University of Wisconsin-Madison, established that the beads from Salūt were made with carnelian from sources in Gujarat, India. This pattern needs to be confirmed with additional samples, but at present it appears that the beads were made by Indus craftsmen in the Indus Valley or in some other region using Indus raw materials. Further research on beads from other sites in Oman is needed to gain a better understanding of the movement of raw materials and finished goods during the third millennium BC.

**Seal and sealing with Indus script**

Finally, two objects with Indus script found at ST1 raise some important questions about the people involved in the interactions between the Oman peninsula and the Indus Valley: an Indus-style stamp seal with a short-horned bull and Indus script, and the fragment of a pottery vessel that had been stamped with a special type of Indus seal with fighting bison and Indus script.

The seal is made from a greenish-grey chlorite and is square with a perforated knob or boss on the back. The boss has a single groove in the centre which is typical of seals from Harappa 3A/B (c.2600–2200 BC) (Kenoyer & Meadow 2010: 12). The front of the seal has a short-horned bull or bison (wild Indian bison, *Bos gaurus*) with lowered head facing a manger-like container and a line of five Indus signs carved across the entire upper register (Fig. 9). The Indian bison is very common on most Indus



SEM magnification 10kv 20x

Indian bison (*Bos gaurus*)

Indus seals from Mohenjo-Daro

FIGURE 9. Salūt ST1: stamp seal with scanning electron microscope (SEM) images and comparative seals from Mohenjo-Daro, Pakistan.

seals found outside the core region of the Indus Valley (Vidale 2005), including Indus-style seals with cuneiform inscriptions found in Mesopotamia, the circular Gulf seals with Indus script, and other Indus hybrid seals from Iran and Central Asia (Frenez, Marchesi & Vidale, in press). Vidale (2005) proposed that this distinctive bison motif identified a specific community of Indus traders who were active in external trade. According to A. Parpola, who statistically analysed the signs frequencies and combinations of all inscriptions in the Indus script found in the greater Indus Valley, and compared them with those on seals and tablets found in Mesopotamia and the Gulf regions (Parpola 1994), the combination of five Indus signs carved on this seal does not show the specificities of the Gulf inscriptions but is coherent with the sequences on seals from Indus sites (A. Parpola, personal communication). Silicone impressions of the seal from ST1 were studied under SEM and compared with similar features carved on seals from other major Indus sites. The tools and technique used to carve the seal appear to be identical to those used by Indus seal carvers (Kenoyer 1997). Some details are not carved with the dexterity that is seen in some of the most carefully executed Indus seals (Fig. 9), but this may be due to the fact that the seal was carved from greenish-grey chlorite, rather than the softer steatite that was the standard raw material used for Indus seals.

Morphology, iconography, inscription, and carving technique directly connect the seal with the contemporaneous Indus seal production, but the use of a grey-greenish chlorite, which was traditionally exploited in Balochistan and the Oman peninsula to produce seals and small containers,

indicates that the seal was made using a non-Indus raw material. The use of chlorite instead of fired steatite is reported for a variety of Indus-related seals found outside the greater Indus Valley, including also a few standard Indus stamp seals with Harappan motifs and cuneiform inscriptions from Mesopotamia (Frenez, in press: Frenez, Marchesi & Vidale, in press). The Indus seal found at ST1 was therefore probably manufactured in the western regions of Middle Asia, either in Balochistan or the Oman peninsula, by an Indus-trained seal carver who used Indus tools and techniques to carve the icon of Indus agents involved in external trade and an inscription in pure Indus script.

Only two barely comparable seals are known from the Oman peninsula. One, in copper with an Indus unicorn and Indus signs still recognizable under the corrosion layers, was found at Ra's al-Jinz RJ-2 in association with a painted Indus jar in levels dating to c.2500–2300 BC (Cleuziou & Tosi 2000: 59–60, fig. 17; Frenez, in press: fig. 7/a). The other was found by Jocelyn and Jeffery Orchard within an Umm an-Nar tomb in the Bisyā' area, near Salūt, and was recently studied by Kenoyer and Frenez for the Oman National Museum (Frenez, in press: fig. 7/b). This small square stamp seal is also made from chlorite and bears a humped zebu depicted in front of a small round object and below two enigmatic motifs, possibly proto-scriptorial signs or more probably, stylized representations of animals.

The seal-impressed sherd from ST1 is a fragment from a typical local jar impressed with an elongated seal showing two bison with heads lowered in combat, and three or four signs of Indus script (Fig. 10). There are traces of black residue on the seal impression, possibly bitumen. The motif

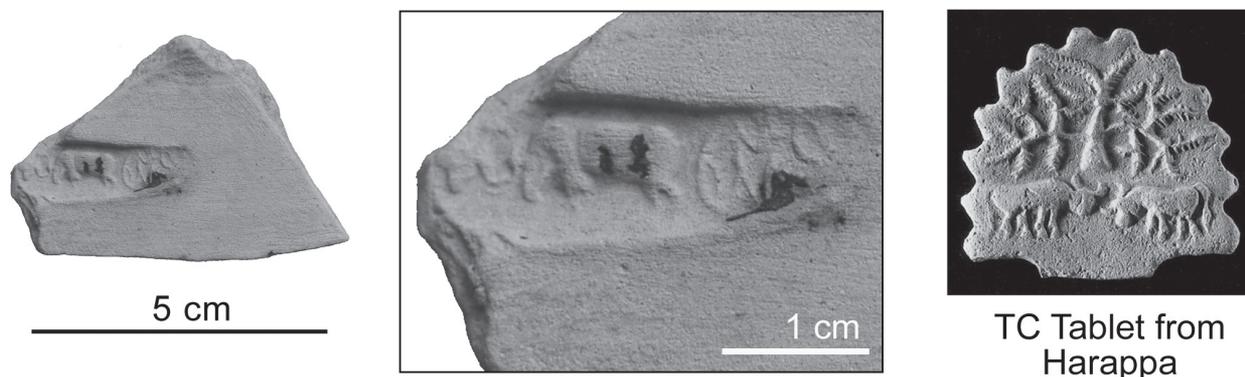


FIGURE 10. Salūt ST1: body sherd with seal impression and comparative moulded tablet from Harappa, Pakistan.

of this sealing can be compared with other moulded tablets and rectangular stamp seals from Indus sites, particularly one found at Harappa and one at Mohenjo-Daro (Meadow & Kenoyer 2005: 220, fig. 11/4; Parpola, Pande & Koskikallio 2010: H-1997B, fig. 64; M-1367). The stamped jar found at ST1 is the first object of this type ever found in the Oman peninsula, but it has comparisons at Tepe Yahya Period IVA, in south-eastern Iran (Lamberg-Karlovsky & Tosi 1973: 137). A second identical impression was just found during the ongoing 2015–2016 field season on the rim sherd of a typical local jar, possibly the same as the fragment presented here in detail.

## Discussion

Before the recent discoveries at ST1, most data documenting interactions between the Oman peninsula and the Indus Valley came from the coastal sites of Ra's al-Jinz RJ-2 and Ra's al-Hadd HD-1, excavated in the 1980s by the French-Italian and British teams of the 'Joint Hadd Project' (Cleuziou & Tosi 2000; 2007; Méry 2000; Reade 1990; Reade & Méry 1988). Careful analysis of the evidence has led scholars to propose that these sites were established by the local communities to manage trade with Indus seafaring merchants, who might have left a small group to reside with the locals or in small enclaves (Cleuziou & Tosi 2007: 237–239).

According to this interpretation, during this period foreign traders did not venture into the interior regions to interact directly with the rich communities involved in the extraction and first transformation of copper ores and prized metamorphic rocks (2007: 184–185, 235). The discovery of numerous fragments of black-slipped jars from interior sites throughout Oman and the UAE was explained as the result of reuse by local groups (Méry & Blackman 2005; Vogt 1996: 125). In the absence of other pottery types and/or other archaeological indicators, they cannot be regarded as conclusive evidence of direct contacts between the local communities and Indus merchants. The recent discoveries made by the French Mission to Oman at Maṣīrah Island and Ra's al-Jibsh added important data to this picture, but did not change the common interpretation of the phenomenon (Charpentier et al. 2013: 93–95).

The new discoveries made at ST1, supported by similar evidence recently identified at the interior sites of Bāt (Döpfer & Schmidt 2014; Frenez, in press; Thornton 2013), require a new model of interaction. It is in fact becoming increasingly clear that Indus objects found at interior sites are not simply the result of segmented trade

of goods involving local communities, but probably included direct interactions with Indus traders and craftsmen who were present and probably settled at both coastal and inland settlements.

The Indus containers related to food production and presentation, such as cooking pots, perforated jars, and pedestalled dishes, indicate that part of the community settled around ST1 was cooking food and drinking filtered beverages using Indus-style vessels, probably following traditional Indus culinary habits. While it is possible that some local people were experimenting with Indus materials and food traditions, it is more likely that individuals or small groups from the Indus region were themselves settled in the area for long periods of time. This interpretation is further supported by the possibility that distinctive Indus styles of pottery, such as cooking pots, perforated jars, and possibly even highly decorated painted pottery were being produced locally by Indus-trained potters. The range of Indus pottery vessels found at Ra's al-Hadd HD-1 was interpreted as representing the presence of a small resident community of Indus merchants on the coast of central Oman (Cleuziou & Tosi 2007: 238–239). An almost identical range of vessels is now reported from ST1, but in addition there is evidence of terracotta toys and pottery discs that might have been used by children, and of the possible local production of Indus-style pottery. When carnelian beads, inscribed seals, and sealings (possibly produced locally) are added to this assemblage, it is possible to conclude that the Indus-related community at ST1 was not only well established but also closely linked to powerful trading communities.

## Conclusions

The role of the Indus trade in eastern Arabia has often been discussed in the general context of local cultural and economic developments, but the organization and mechanism of this trade are not yet precisely decoded. The collection of Indus and Indus-related artefacts from ST1 provides solid information for proposing new models of transcultural economic interaction. The Kot Diji grooved sherd testifies to an early integration (possibly from 2800–2600 BC, certainly from at least 2400 BC) of sites located in central Oman within the network of long-distance connections that directly linked the Indus regions with the western shores of the Arabian Sea. The presence in the pottery assemblage found at ST1 of a wide range of Indus types, including utilitarian pottery and specific forms used for food

preparation and presentation, suggests that some degree of cultural interaction occurred along with the expansion of trade. The discovery of Indus seals manufactured with non-Indus raw materials, but with tools and techniques associated with Indus productions, further supports the idea that merchants and craftsmen from the greater Indus Valley were living and working at interior settlements in the Oman peninsula. This hypothesis is further supported by the presence of toys for children and heavily decorated pottery vessels, which in the Indus region are associated with social and ideological rituals deeply rooted in the local traditions.

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Our paper is dedicated to the memory of Serge Cleuziou and Roland Besenval, who dedicated their lives to the study of prehistoric developments and interactions in Pakistan, Central Asia, the UAE, and Oman.

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