

STUDI EGEEI E VICINORIENTALI 1

STUDI IN ONORE
DI
ENRICA FIANDRA

*Contributi di archeologia
egea e vicinoorientale*

a cura di M. Perna

Napoli - 2005

DIFFUSION: DE BOCCARD
11, RUE DE MÉDICIS – 75006 - PARIS

STUDI EGEI E VICINORIENTALI

Collana diretta da:

M. Frangipane, M. Perna, F. Pomponio, D. Schmandt-Besserat e J.G. Younger

Institute for Aegean Prehistory

Istituto Banco di Napoli - Fondazione



Il presente volume è stato realizzato con il contributo dell'Institute for Aegean Prehistory (INSTAP) e dell'Istituto Banco di Napoli – Fondazione.

STUDI IN ONORE DI ENRICA FIANDRA

Contributi di archeologia egea e vicinoorientale, a cura di M. Perna

ISBN: 2-7018-0193-1

In copertina: Leptis Magna, la Basilica all'epoca dei primi scavi.

The Lothal Sealings: Records from an Indus Civilization Town at the Eastern End of the Maritime Trade Circuits across the Arabian Sea

Dennys Frenez - Maurizio Tosi*

The Indus Civilization has been identified more than 80 years ago as an independent cultural complex contemporary to the great Bronze Age Civilizations in the Middle East.¹ Nonetheless, in spite of a continuous flow of researches, many fundamental aspects of its social-political, economic and cultural organization are still very elusive. The knowledge of its bureaucratic and administrative systems and their variations across space, time and functions are rather poor, and often closely depend upon pre-constructed theories about the nature of the Indus Script. Our almost complete inability to understand the semantic systems used in the Indus Valley during the second half of the 3rd millennium BC still prevents us from a positive interpretation of several types of inscribed objects. In this framework, clay sealings, given the possibility of proposing comparisons with other well documented contemporary contexts, represent the most promising category.

During the last decades, archaeologists were able to reconstruct a complex set of techniques and procedures centred on the use of the seals and their impressions on clay lumps, used since the late 6th-5th millennia BC for managing store-rooms and stored goods. We owe, in first place, to architect Enrica Fiandra and her studies on Festòs, Shahr-i Sokhta and Arslantepe, the identification of sealings as actual managerial documents and archives records within ancient administrative systems.² The procedures described by Enrica Fiandra, given their wide and standardized

* Dipartimento di Archeologia (sede di Ravenna), Università degli Studi di Bologna, via San Vitale 30 - 48100 Ravenna.

¹ Marshall 1924, 1931.

² Ferioli & Fiandra 1989; Fiandra 2000; Fiandra 1975; Fiandra 1982; Fiandra 1982a.

application in different cultural areas and civilizations, could be defined with an expedient acronym as TASS (*Transcultural Administrative Sealing System*). TASS might have involved a basic three-steps procedure:

1. goods were physically taken in charge by officials and stored within movable containers or/and inside closed rooms or buildings, sealed by applying clay lumps impressed with one or more different seals on the fastening systems;

2. clay sealings were broken to remove the goods from the storage-spaces and their fragments were often preserved for a defined period of time for book-keeping within proper archives;

3. the archives were often “cancelled” discharging broken sealings within a suitable place (for example a structural filling or a hole under a floor), thus preventing the possibility that sealings could be re-used in fraudulent ways.³

Historically speaking, this conceptual organization of administrative systems seems to have widely travelled overland and overseas, to be adopted in different cultural contexts. Within TASS there were limited set of variations as far as the shape and motifs of the seals on the one hand, and packages and fastening systems on the other.

Seals and sealings in the Indus Civilization

Carved square stamp seals made of fired steatite are one of the most typical and abundant standardized products of the Indus Civilization.⁴ This category of seals seems to have been introduced, along with the use of terracotta sealings and an early form of Indus Script, during the first half of the 3rd millennium BC.⁵ In spite of a great variability in manufacturing quality, soon these seals appear in standardized types both in terms of form and representations.⁶ It is well known that the greatest majority of Indus

³ Ferioli & Fiandra 1989: 566.

⁴ All the seals and sealings quoted and represented in this article will be referred, if possible, to the Parpola's CISI (Joshi & Parpola 1987, Shah & Parpola 1991).

⁵ Kenoyer 2000; Meadow & Kenoyer (in press); Frenez (in press).

⁶ Naguchi 2003; Franke-Vogt 1992.

square seals bears zoomorphic iconographies and more rarely narrative figurations, probably connected with religious and mythological beliefs.⁷

Moreover, a short sequence of Indus signs was carved above almost all the images. The examination of the seal impressions, both on sealings and on the so-called tokens (round or rectangular), suggests different roles for such semantic and iconographic seal elements. Actually, a large number of seal-impressed clay artefacts bears only impression of the inscription, while the main image could be covered by successive impressions, obliterated by fingerprints or simply not impressed.⁸

After the high number of seals recovered in most Indus Civilization sites (about 5000), one might expect a proportionally frequent finding of clay sealings, but no more than a total of 130-140 sealings (93 of which from the single site of Lothal) have been found, so far, in the same sites.⁹ When compared to the sealings regularly found by the thousands in Mesopotamian and Near-Eastern sites, this rate is doubtless anomalous.

Nonetheless, such rare sealings give us the picture of a refined and complex administrative technology, perhaps even more rigorous, specific and accurate than the Mesopotamian one. This latter appears sometimes organized in a rather self-confident and almost superficial way, probably due to its everyday use to manage on a large scale the transactions connected to the concentration and redistribution within the cities of the agricultural products everyday supplied by rural districts for feeding humans and animals as well as for the needs of various basic proto-industrial processes. The low number of sealings found in the sites of the Indus Civilization rather suggests, in contrast, that the main concern was to

⁷ More properly, images of a single animal, realistically conceived or not, out of a discontinuously attested series of about 10 animals, images of composite creatures or monsters, and rarer scenes where human-like figures appear in more elaborated iconographies and symbolic scenes. See for example the scenes with a personage squatting on the branches of an acacia tree, or the few seals with a figure sitting in a "yogic" position.

⁸ It has been frequently proposed that Indus seals were used mainly as amulets for personal or clan identification, and not for creating impressions on clay tags as administrative devices. This evidence suggests instead that the semantic function of indicating direct role/clan identification or religious functions could have been performed by animals and the rare complex scenes represented on seals, with the inscription to provide other information. Thus, the late (Harappa 3C, 2200-1900 BC) rectangular seals with inscriptions only might have adopted after the formalization of these different roles and with the consequent creation of new assemblages of objects specialized for administrative and ritual/magical purposes.

⁹ Ethnographic researches suggest that the low number of sealings ever found in the Indus sites might be due, particularly for the early phases, to the use of other useful materials instead of clay, to make the sealing lumps, as a dung/ash mixture covered by a thin layer of ash to improve the seal impressions (Hallaq 1994).

control and warrant particular manufacturing processes and to manage exchanges of raw materials and finished goods.¹⁰

As far as we presently know, proto-Indian economy was one of the largest and more complex co-ordinated organization of the Bronze Age, continuously spread over a remarkably wider, and culturally and ecologically more variable, domain than those controlled by contemporary early states in Egypt and Mesopotamia. The configuration of the great urban centres of the Indus Valley, in some cases repeated in their fundamental traits also in smaller centres, points to a strict and accurately defined hierarchy of social roles and to a relative complexity of management. Therefore, it seems quite impossible to conceive its administration without a continuous and systematic recourse to the record of commercial transactions and to the signature of contracts and proto-notarial deeds. State or not state, market or not market, it would be trivial to debate about the possibility that an economic and productive system of this order of magnitude had been developed and consolidated only on the base of common kinship interaction, spontaneity and mutual trustfulness.

Lothal and its “Warehouse”

The largest number of sealings ever found within a site of the Indus Civilization (as stated above, 93 of about 130-140) was discovered at the small site of Lothal, identified in 1954 by S.R. Rao on the final trait of the Sabarmati River, before its debouching into the black, sandy mud of the Gulf of Khambhat. After a first phase, when the Indus Civilization traits developed onto a local culture (Period A-I, ca. 2450-2350 BC),¹¹ Lothal rose as a typical Indus town. It was enclosed within a wide mud-bricks trapeze-like enclosure (about 300 x 200 m), with houses and other buildings raised on top of massive box-like platforms in the same material, as a protection from subsoil humidity and salinization (Period A-II, ca. 2350-2200 BC). In the south-eastern corner of the enclosure, a “Citadel” with the most important buildings was distinguished from the “Lower Town” by platforms 5 m high. After a peak of welfare (Period A-III 2200-2000 BC), at the end of the 3rd millennium BC Lothal seems to fall into a sudden decline: the efficient drainage facilities were clogged up, the large

¹⁰ For example, Halim & Vidale 1983; Vidale 2000 : 89-92; Bhan *et al.* 2003.

¹¹ Rao 1979: 28.

buildings on the Citadel abandoned and a wide part of the residential quarters depopulated. According to the excavator, some areas were resettled during the first century of the 2nd millennium BC with craft areas spreading across both Lower Town and Citadel, ignoring the former urban planning (Period A-IV, 2000-1900 BC). Afterward, a later community ascribed to a local culture settled a small part of Lothal mound until the half of the 2nd millennium BC (Period B, ca. 1800-1600 BC).

A huge rectangular water-tank (210 x 35 x 4,5 m) lined by backed-bricks had been excavated along the eastern side of the town in Period A-II, likely to provide water for the inhabitants and the surrounding rural district.¹² Most probably the excavated material was used for building the “Citadel” platforms. In the north-western part of the “Citadel” (SRG 3, Block C) Rao found a heavily eroded mud-bricks platform (50 x 40 m), probably built in the first stage of Period A-II (2350-2200 BC). The damaged ruins of an anomalous building, labelled “warehouse”, came to light on the top of this platform. The “warehouse” had 11 quadrangular mud-bricks blocks (2 m wide and 1 m high), with traces of a twelfth one, set in three rows of four blocks each. These small square basements are separated by 1 m wide passages with baked-bricks floors ending into as many slots, interpreted as seats for wooden sliding elements.¹³ Thick layers of ash and charcoal, pieces of charred beams and hundreds of burned clay lumps bearing cereal husks and reed marks suggested that the building was destroyed by a major firing at the end of the 3rd millennium BC.

The interpretation this building is still controversial for the lack of precise and reliable documentation, but also for its quite unusual features. For its parallel rows of quadrangular blocks the “warehouse” might recall the so called “granary” at Mohenjo-Daro,¹⁴ but the comparison just adds to the problem another unsolved question. A new interpretation has been recently proposed by J.M. Kenoyer, on the base of his experience in the identification of the “ghost-walls” found at Harappa. Kenoyer suggests that

¹² Rao explained this structure as an harbour or dockyard for boats that might have sailed up an hypothetical navigable river to moore then at Lothal. It could be otherwise possible, as pointed out at Harappa (Kenoyer 1998: 163) and Dholavira (Bisht 1991: 80), that the presence of wide water-tanks was a distinctive feature of many sites of the Indus Civilization, just as in many modern towns and villages across the Indo-Pakistani subcontinent. The accomplishment of a similar hydraulic enterprise must have required a greater manpower than the one normally provided by the population resident at Lothal. Even a small town like Lothal evidently had sufficient authority and power to mobilize and organize the manpower of its rural and coastal surroundings for large public works .

¹³ Rao 1979: Fig. 18 and Plate LXXVIII.

¹⁴ Wheeler 1968, Fentress 1984.

the blocks found by Rao at Lothal could be simply the result in negative of spoliation-trenches excavated for recovering baked bricks.¹⁵ Nonetheless, Rao clearly wrote in the excavation reports that the eleven blocks were reddened by heavy heat in the outer and in the uppermost brick-lines, while the core was still unbaked,¹⁶ and that the best preserved basement was coated with mud-plaster both on the sides and on the upper surfaces.¹⁷ Unless Rao was dramatically wrong in his observations, the parallel basements already existed as standing features in the 3rd millennium BC.

Contexts of the Lothal Sealings

At Lothal Rao found 93 terracotta sealings, about 70 of which reportedly in a single cluster in the “warehouse” and the rest scattered in other points of the site.¹⁸ The 70 terracotta sealings from the “warehouse” were found in several overlapping layers within a small area (about 1 sqm) over the baked bricks floor at the southern end of the passage between the innermost blocks in the south-eastern corner (blocks 41-I & 41-J in Rao’s Report). In order to support the hypothesis of the obliteration of an archive, one should demonstrate that they had been intentionally discarded into one or more primary dumps. If the sealings actually fell down while the wooden superstructure of the building was burning and collapsing, as originally suggested by Rao, they might have retained part of their original spatial association and setting, and in this case we could confidently speak of a sub-primary context. Unfortunately, without a more detailed stratigraphic information it is now impossible to realize the actual context

¹⁵ According to J.M. Kenoyer "Rao's identification of mud brick blocks in the so-called warehouse is quite problematic. The hollow areas between these blocks is identical to wall voids left by brick robbing at Harappa, where the brick building was constructed on top of a massive mud brick platform or foundation. The width of the wall voids is consistent with brick walls of large buildings and the traces of remaining fired bricks in one wall void is further evidence for the brick robbing. At Harappa, brick robbers often left the lowest layer of bricks in parts of the trenches where it was becoming too dangerous to work. At Lothal it is not clear if they were removing bricks from above or tunnelling. Other evidence for brick robbing is the fact that thresholds, drains and bathing platforms are all that remains of many house structures at the site. At Harappa, where careful documentation of stratigraphic layers has been implemented, the tunnels of the brick robbers followed the walls and generally missed the thresholds, drains and bathing platforms. If this pattern of brick robbing was carried out at Lothal, it would leave the same types of wall voids filled with rubble and debris." (Kenoyer, personal communication).

¹⁶ Rao 1979: 62.

¹⁷ Rao 1979: 113.

¹⁸ The total amount of sealings belonging to the “warehouse” cluster oddly changes in Rao’s publications, from the 65 quoted in Rao 1979 (p.113) to 69 (Rao 1985: 319) and even to 71 specimens (Rao 1985: 305).

of deposition of the sealings. At any rate both the possibilities – primary context, equal “cancelled archive”; sub-primary context, equal primary collapse of an original association – only stress the centrality of the Lothal sealings in the frame of the study of Indus administration systems.

The artefacts are very well preserved and one can easily appreciate the great care spent in shaping and impressing the clay lumps. Almost all the sealings found at Lothal (except for 10 from the “Lower Town”) apparently underwent an intentional process of baking (or drying), in order to facilitate their preservation and storage.¹⁹ This evidence has been often underestimated or misunderstood, because of the association of the finds with the surrounding firing layers, suggesting an accidental exposure to flames. Archaeological experience suggests that firing within a burning building is often not homogeneous, while the Lothal sealings were instead uniformly baked, without any evident differences between those found in the “warehouse” and the baked ones found in the “Lower Town”. The soot marks still visible on some sealings might be derived by contact with carbon deposits in their post-depositional contexts, but this controversy might last forever, because most probably not even an accurate series of chemical and physical analyses could solve this long-debated question.

The sealings discovered at Lothal have a great importance not only for their number, but also because their great majority was found within a single cluster. The analysis of this fundamental aspect is in fact hindered by the lack in Rao’s reports of a complete and precise account of the discovery contexts. The excavator mentions about 70 sealings as coming from the “warehouse”, but he listed in detail only the ones published in the photographic plates at the end of his second volume, which are also annotated within special tablets reporting also the stratigraphic context.²⁰

Only 35 sealings are therefore certainly referred to the “warehouse” (W, in Table 1) and only 11 specimens can be positively ascribed to external contexts (O, in Table 1). Thus, out of a total of 93 discovered in the whole site, we have 46 sealings only with a precise provenience.

It is indeed possible try to fill such documentary gap by putting forward few simple hypotheses. A close examination of the seal

¹⁹ The suitably practice to bake or warm up the sealings, perhaps on a relative low temperature, to dry the clay in order to prevent their rapid ad total disintegration, is well know for the Bronze Age and the later administrative systems (Fiandra 1975: 24, note 57).

²⁰ Rao 1985: 325-8

impressions, confirmed by a previous research by Asko Parpola,²¹ shows that several of the sealings undoubtedly discovered in the “warehouse” bear impressions of some particular seals that were used on other sealings, both with single and multiple impressions. It is so rather probable, although not certain, that sealings with impressions of a same seals belonging to the same group and so that all the sealings bearing at least an impression of these seals was actually found in the “warehouse”. This assumption allows us to add other 18 sealings to the main group (**W**¹, in Table 1), and thus to assemble an amount of 53 sealings that we can likely ascribe to the “warehouse”. Furthermore, if we include the sealings that Rao ascribed to SRG3 (the same general area of the “warehouse”) but having no impressions of any recurrent seal (**W**², in Table 1), we obtain a sum of 64 artefacts. The precise spot of discovery, in this light, would remain doubtful only for 17 sealings (? In Table 1). Rao’s original group of about 70 sealings is thus somehow re-assembled and can be studied as a meaningful context.

Description and typology

The core of this research concerns the morphological description and the functional interpretation of the Lothal sealings.²² The analysis of the imprints on the clay lumps reverse shows that the sealings were applied on various fastening systems for the closure of rooms, structures (in this paper, architectural elements or parts of furniture) and “movable” containers.²³ For several reasons, in the sealing systems frame the Lothal group turned out to be a quite difficult case.²⁴ Most of the sealings are very complex and

²¹ Parpola 1986: 402 (Fig. 1).

²² The study of the terracotta sealings and particularly of their reverses is based on two sequences of photographs took between 1989 and 1993 by Maurizio Tosi in occasion of his visits to the Lothal Museum. Dennys Frenez did a last campaign of photographing of the Lothal sealings in January 2005 to complete de documentation with a new set of high resolution digital images.

²³ In this paper, for “movable” containers we mean all containers, such as boxes, vessels, bags or sacks than can be easily handled and moved around without any direct reference to their use in a commercial sphere. In other contexts better known after analytical research one could demonstrate that the clay used for the sealings was local, and that consequently all administrative actions were performed in the site itself. Available evidence, so far, strongly suggests that the practical application of these administrative systems to long-distance trade was exceptional, and not a standard practice.

²⁴ Dennys Frenez could spent only 4 days handling and photographing the sealings, but he had no time to draw them in details. A next stage of examination should be required to exhaust this research, drawing almost the more complex and ambiguous sealings and likely carrying out an adequate series of silicone casts.

combine multiple imprints on a same surface, caused by the contact with different materials and elements. The dichotomous distinction between *recto* and *verso*, bearing respectively the seal impressions and imprints of the sealed objects,²⁵ is often inadequate to describe the sealings found at Lothal. The average size of the Lothal sealings is quite smaller than the ones found in Mesopotamian and eastern Iranian contexts (i.e. Sharh-i Sokhta). This feature severely reduces the amount of data inferred by the sealings examination, because the clay lumps bear impressions of a very small sealed surface. The Lothal assemblage includes quite different and to a large extent unknown types, evidently used in the frame of very poorly known administrative technologies. The few, scarcely numerous groups of sealings from other Indus sites had never been studied in details and, poorly published, do not offer a sound comparative ground. A cluster of 93 sealings, with a relatively high number of *unica* or seemingly particular cases, is often too limited for successfully defining new fastening systems categories. Consequently, in some cases we limited ourselves to a detailed description of their features. When a complete understanding of the sealing is not possible, even a morphological description may be problematic, most of all with regard to its orientation. In these cases the terracotta lumps were ideally oriented with a main reference to the readability of seal impressions, assuming that this feature could be a function of the most probable work-position onto sealings applied to elements having their own unknown orientation. In these conditions it was obviously impossible to apply confidently the normative typologies used in other contexts where sealings were found by the thousands. The following pages provide a first classification of the Lothal sealings in functional and morphological categories, named after the identification of the sealed device (see also Table 1).

Type 1, Pegs-on-Wall
(9% site; 15% “warehouse”)²⁶

All sealings of this Type were found in the “warehouse” cluster and testify the use of pegs-on-wall (in wood or stone) to close doors, suggesting that existed at Lothal an administrative control on the access to particular

²⁵ Fiandra 2002: 12.

²⁶ The term “site” concerns the percentage with reference to the total amount of 93 sealings found at Lothal, while “warehouse” concerns to the group of about 70 sealings found together within this structure (see the Graphics 1 & 2 for a general sight).

rooms, probably storage spaces. Sealing L-206 (2 preserved seal impressions on the exterior) shows the cone-arc shaped section distinguishing this well-known type in other contemporary administrative systems. The clay was applied onto a regular, well polished cylindrical peg probably in wood. The peg seems to have been stuck into a surface that, because of the coarseness of the clay, did not retain diagnostic impressions.

Sealing L-179 (2 badly preserved seal impressions on the exterior) was equally pressed against a well-formed, highly polished peg (perhaps in stone), put in a hole made into a wooden surface (a wall or its covering).

On the basis one clearly identifies the impressions of wooden planks.

A small subtriangular projection is visible immediately around the hole left by the peg, probably due to the penetration of the clay into a corner-like cavity formed after repeated actions of inserting and removing the peg itself from the hole. In other cases, we hypothesize that once inserted in the hole, the peg was supported in its place by pressing around chaff, whose imprints are sometimes recognizable in the rear face of the sealings all around (see for example L-175). The pegs diameters waver around $2,5 \div 3,5$ cm. Sometimes their contour show a step (L-154), or even a continuous variation (L-179), although the limited size of the sealings does not allow an easy perception of their general shape.²⁷ In some cases it is even possible to see the imprints of the rope tied to the peg for locking.

All ropes seem to have been made with vegetal fibres, and share a round (L-173) or flattened (L-154) section.

Type 2, Structures
(14% site; 15% “warehouse”)

An interesting but still not better interpretable type is represented by a series of sealings probably used to seal the joints between movable parts of structures like doors or wickets as architectural elements, or as parts of furniture.²⁸ These sealings might have also been applied on crates, or onto

²⁷ During a recent visit to the National Museum, Delhi, Frenez noted a stone object exhibited as a pestle that could have been used, instead, as a peg for the closure of doors. Made of a fine-grained limestone, free from abrasion marks on the supposed functional end and distinguished by a regular series of parallel, well fashioned grooves along its length, this element does not conform to the features one would expect in a pestle.

²⁸ The use of large wooden infrastructures in the Indus Civilization may be inferred on the basis of the spatial patterning of the *Turbinella pyrum* waste discovered at Bagasra. Unworked shell and unfinished

gratings belonging to any of the above. The peculiarity of these sealings is that they do not show strings or any other fastening system, suggesting that the sealed surfaces could be easily opened and closed without the complex systems of pegs-on-wall and lockers used for the room doors or for safety containers. It is also possible (but it would appear very unusual in the general picture of the sealing systems of the 3rd millennium BC) that these sealings were not directly applied to the main fastening device, but simply shifted to other appropriate joints.

Sealing L-190 (bearing impressions of at least three different seals) had been clearly applied between two parallel wooden sticks, as indicated by the imprints on its reverse. The transversal section of this particular sealing is roughly T-shaped, with a central protruding element marked on its sides by the clay scraping on the rough wood of the parallel sticks during the setting up of the sealing. Several fingerprints are visible on its most protruding face, testifying that the clay lump did not meet any surface when pressed between the wooden sticks. These fingerprints were probably left when the clay lump was modelled into a proper fashion before its application and pressing between the sticks. Otherwise, it might be possible that the sealers, while putting the impression from front, had to hold the rear of the sealing from the interior, thus preventing the clay from being pushed inside. This also implies that the gaps between the sticks allowed an easy access to the operator's fingers, depicting a grating-like structure. L-189 seems to be quite similar to L-190. It shows a triangular cross-section with the basis facing rear. On the 2 frontal orthogonal faces 4 seals were impressed in depth, 2 on each face, with 3 unicorns and another one probably bearing the image of the Indian short-horned bull or gaur (*Bos gaurus gaurus*). The sealing presents fracture surfaces on the sides and on bottom, while the uppermost surface was carefully modelled and bears, still perfectly recognizable, a set of fingerprints. The rear is only partially preserved and shows a series of deep vertical parallel imprints very similar to those of L-190, although less preserved. Moreover the 3 seals used on L-190 were used also on L-189.

L-130 provides a clear example of some sealings possibly applied onto a structural feature (not necessarily architectural), but also illustrates basic difficulties of interpretation. This sealing is almost complete and the

bangles appear to belong to almost square heaps, with straight sides and right angles, suggesting their original storage within wooden containers (Bhan *et al.* 2003: Fig. 31 & 33).

only fracture surface is visible in the edge cutting the seal impression. The surviving part has a seal impression on the front side, a rear with a double concave surface, rough and irregular (as if created by the contact with a pliable medium), an upper surface with partial but clear marks of parallel sticks, and one lateral rough surface with fingerprints, possibly covering the doubtful, badly preserved remnants of a previous geometric stamp seal impression (a similar labyrinth cross-like motif is well visible on L-173).

The sealing seems to have been pressed against some kind of corner-like recess, with the last face we described in sight. Ideally, such a recess could have been part of a frame, and the sealing might have locked a door or panel; but it is hard to understand how exactly such sealings could work, or the precise features and mechanics of the locking system. L-145, found on surface, closely reminds L-130. In shape of a parallelepiped, it shows a single seal impression, apparently applied below the angle between 2 flat surfaces, easily recognizable as the upper and lateral surfaces of the lump.

The rear imprints are not recognizable. A string (perhaps in leather) is impressed on the face of the sealing on sight left of the seal impression.

Edges of clay in excess in some points cover the imprint of the vertical element on the left surface. This last feature let us suppose that the sealing was removed from its seat while the clay was still in a plastic state, i.e. before the end of a single day of work.

L-193 shows 3 superimposed seal impressions and on the rear the clear imprint of two structural features in orthogonal position (pegs or bamboo canes). A careful inspection of the imprints suggest that the two elements were connected and did not slide one onto the other forming some kind of lock. The upper face is flat and shows definite marks of a wooden surface. It might have been part of a wooden frame or of some kind of rounded ridge. L-198 (2 superimposed seal impressions) is covered with heavy concretions and fracture surfaces are not easily distinguished from primary functional ones. Imprints of some corner elements and surfaces incident from various angles are visible on the rear. One cannot exclude that this sealing, like Type 2 ones, had been applied to close some kind of wooden locker.

L-141 and L- 207 are rather massive clay lumps (both are about 6 x 8 x 4 cm), whose shape might have been roughly hexagonal or anyhow polygonal. Both bear unclear angular imprints, on the upper edge (L-141) and on the edges of the rear (L-207), where they might form the angle impressed by a single rectangular cavity.

Type 3, Lockers
(7% site; 5% “warehouse”)

For “lockers” we mean the mechanical elements used for closing a movable surface onto another one, fixed or equally movable. Such “lockers” were usually made of parts physically belonging to these surfaces and by other freely moving joining elements. At Lothal, such closure devices could have been applied onto boxes, trap doors, furniture doors and sliding panels, as demonstrated by their flat section and probably square contour, but we have been unable so far to reconstruct in detail their mechanics (for analogy with 2 well preserved specimens all flat fragments retaining part of a square form were grouped in this Type). These sealings have well fashioned edges, and retain a single well centred complete seal impression (see L-158). At least 1 specimen had been applied on a quadrangular-locker using movable wooden stakes (L-144).²⁹ Another smaller specimen, flat on the front side and rounded in the rear, has if applied into a small cavity, retains the upper impression of a pointed object, perhaps a wooden peg (L-148). L-149 is a large fragment of a similar sealing, widely covered by a post-depositional surface deposit. The unicorn sealing, only partially preserved, seems to have been applied in the centre.

The rear is flat and shows the imprint of a vertical plank. The tag seems to have been applied between such vertical surface and the protruding edge of a wooden frame, whose orthogonal imprint is recognizable on the left side, where the sealing was broken.

L-209 is a small crescent-shaped clay lump with a sub-triangular section and a long fracture surface on the side similar to some fractures encountered on some “lockers” tags. The sealing bears 2 parallel impressions of the same inscribed object. The imprints show an horizontal sequence of poorly preserved signs (or symbols), framed by 2 parallel deep lines in relief, running parallel to rounded edges. The other anomalous feature is a strong restriction to the left edge. On the whole, the object used for the impressions seems to have been a miniaturistic tablet with a central restriction similar to those found at Harappa (see for example H-337,³⁰ possibly part of a token to be split in two symmetrical parts). Miniaturistic tablets with a frame of deeply carved lines around the inscription are rare

²⁹ Well known even after the graphic reproduction in Rao 1985: 320 (Fig. 38 B-2).

³⁰ Joshi & Parpola: 228.

but still present in the corpus (see for example K-76³¹), while similar frames are not documented in steatite seals. We are aware that this would be the only case so far attested of the use of such tablets on clay tags, and therefore an highly peculiar evidence, but the features of this double impression are difficult to be otherwise explained.

Type 4, Parallel Canes
(4% site; 5% “warehouse”)

Three sealings show on two sides impressions of thin parallel canes (L-134, L-140, L-180). They have been probably put on the corners between trellis surfaces of structural elements. It is also possible that they belonged to canes wrappings for packages. This type of sealings is quite important because it finds a strict parallel with the Kalibangan sealings (K-85 in Parpola’s CISI), suggesting that these stamped tags were used to close a typical Indus structure or a strong package for marketable commodities. A particular variant bears impressions of two small canes tied together with a thin string and then covered with a fine fabric (L-146). This sealing might be compared with the one with the impression of an Indus unicorn seal found at Umma,³² showing on rear traces of a rough fabric covering the joint of several parallel canes. This suggests a possible use for commercial packaging and/or the presence at Umma of Indian trade communities precisely repeating abroad their techniques and organization forms. Another specimen flat in section bears the imprint of a horizontal vegetal element on the rear, possibly a cane or a bundle of reeds, or a composite packaging surface tied with a orthogonal cord (L-143).

Type 5, Wooden Surfaces (Boxes?)
(16% site; 25% “warehouse”)

Twelve sub-triangular or oval sealings coming from the “warehouse” cluster bear all single impressions of the same seal, bearing the image of an elephant and a short inscription with four Indus signs (L-161÷172). These sealings were carefully applied on the knotted-strings that seem to have closed boxes with finely-treated surfaces of polished wood. It is possible

³¹ Joshi & Parpola: 313.

³² Tosi 1991: 115 (Plate 97 and 98).

only conjecture about shape and size of these boxes, but the high quality of the surface treatment might suggest that they were likely small caskets, rather than large chests. The clay tags covered strings running onto the surface of the boxes, while in two cases (L-163, 167) they were applied onto strings passing around the edge. It is however impossible to understand if the caskets had been tied with strings as a form of packaging or if the strings impressed on the clay were part of a fastening device applied to the boxes.

A distinctive feature of these sealings marked by the elephant seal are many parallel fingernail tallies (up to six), over or on the right of the seal impressions. These marks had been interpreted by Rao as the result of a quite banal gesture (removing the exceeding clay after the impression of the seal).³³ Fingernails rather seem to have been impressed for administrative purposes. For example, they could have registered the number of units stored within each box, but 2 sealings without fingernail impressions (L-165, L-170) might require a different explanation, even if they could be present in the part of the tags not preserved. Actually, the elephant sealings discovered by Rao within the “warehouse” seem to have been used to manage in a defined accounting period a small number of boxes (or even a single box) used as storage facility for special goods. At the end, the stored sealings might have represented accounting records. If fingernail impressions referred to the goods stored in the boxes, such goods might have not been homogeneous masses, aggregates or fluids (for example scents and fragrances, spices, honey, oil, or seeds), but solid individual objects representing enumerable units (manufactured objects, raw materials, stones and other). Such tallies could also indicate units taken from a box or introduced in it from time to time, substituting the tag.

Otherwise, if tallies instead referred to general storage information (for example, counting of boxes, chronology, location and the like), questions regarding the content cannot be addressed.

Another sealing is marked with 5 fingernail tallies (L-142). This clay plano-convex pill bears the single impression of a small seal with the unicorn and its flat rear retains impressions of several braided strings. This finger-nailed clay lump might have been used on a container similar to those sealed with the elephant impressions. Two sealings seem to have also been used on wooden boxes. L-211 bears three beautiful seal

³³ Rao 1985: 321.

impressions overlapped so as to keep visible only the inscription of the previous impressions. The clay lump were pressed to cover a knotted strings tangle on the corner of a flat surface of polished wood, probably another box.³⁴ L-125 undoubtedly belongs to the “warehouse” group and bears a single impression of the most recurrent seal, partially obliterated by some fingerprints that cover the unicorn only. The breakage surfaces on 2 sides of the clay tag reproduce string impressions, while the back shows marks of thin parallel lines. Such lines might be impressions of a not well polished wood surface, or (in theory) turning traces on an almost horizontal vessel shoulder (see below, Type 6). This second hypothesis is anyhow unlikely, because if we orient the sealing on the base of the supposed turning traces, the string traces do not run on the interior, as one would expect in the normal closures of jars and vessels.

Type 6, Pottery
(23% site; 29% “warehouse”)

Store-rooms and archives in Mesopotamia and in the Near-East always contained a large amount of clay sealings used to warrant many types of jars and vessels. Analysis of the clays generally proved that containers were not used for commercial purposes, but as independent small storage-spaces. Containers might be closed in various fashions, but the most common technique used a leather or textile cover applied the mouth and tied just under the rim with a knotted string. Many sealings at Lothal show the characteristic curved impressions of vessels rims (see L-177, L-187), sometimes even marked by the typical wheel marks (see L-133), and in rare cases of the shoulders with imprints of the strings that fastened the cover (see L-181, L-188). L-174, found outside the “warehouse”, bears two impressions of the same geometric seals with a swastika-like pattern. With a diameter of 12 cm, it was carefully modelled around the rim of a small vessel. No clear traces of the cover are recognizable. There are least two sealings without parallels in other contexts that could have been applied onto covers made of vegetal elements. L-124 might have sealed a small vessel closed with interwoven straw. Straw imprints are well visible on the rear of the sealing, gently

³⁴ Rao published the photograph of a silicone cast of L-211, that clearly shows the strings interlacement near the box edge (Rao 1985: Plate CLI-A-2).

pressed within the mouth (about 2 cm in diameter). L-204 shows two seal impressions (of the same large unicorn seal?) deeply pressed within two orthogonal incident surfaces of the clay tag, thus forming a kind of lug on the edge. The rear surfaces bear wicker marks, suggesting a lid for a pottery vessel or a wicker basket.

Other Types

The Lothal assemblage also include several specimens that have no parallels with other sealings. The interpretation of these latter interesting pieces is quite problematic, and their attribution to a precise Type, like for many other specimens, was not possible. L-126 bears a impression of the most recurrent unicorn seal and might have been applied to a leather sack or bag. On its back are visible imprints of a soft, not-woven material that when pressed took the form of irregular pleats. The use of sacks is notoriously well represented in other archaeological contexts.³⁵ L-208 bears at least 2 overlapped seal impressions and was directly applied on a rope (about 1,5 cm in diameter) without any visible surface impressed on sides or back, because both the lateral sides were carefully moulded around the roper and retain well preserved fingerprints. This is the only specimen of this type and was found outside the “warehouse”, so it is very difficult to understand its actual use. It seems to be evident that a similar sealing, not applied on fastening elements, joints of movable parts or other security devices, did not had any “mechanical” role. It might have performed pure functions of control and supervision. L-151 is a thin square sheet of clay with the badly worn impression of a unicorn seal (2,5 cm in side). This sealing seems to have been applied on a very soft material, because the seal impressed both the clay tag and the underlying surface when stamped. No fastening devices are visible.

Administrative management of the Lothal “warehouse”

The discovery within the Lothal “warehouse” represents the highest concentration of terracotta sealings ever found within an Indus Civilization site.³⁶ But if we look at contemporary discoveries in Iran and Mesopotamia,

³⁵ Ferioli & Fiandra 1983: 474-84.

³⁶ The investigations carried out in Mohenjo-Daro and Harappa during the thirties of the last century, were made with inaccurate and blunder techniques and methodologies of excavations, probably aimed at

a cluster of about 70 sealings (plus other 20 scattered across the site) would not be considered such an exceptional find. 70 sealings could represent the temporary archive of a small commercial agency, but it would also be well comparable with many groups found in the households of Shahr-i Sokhta during the first half of the 3rd millennium BC,³⁷ and more generally in the Near-East and in Mesopotamia during the 4th millennium BC. In our opinion, the Lothal sealings might have belonged to a small agency that managed a restricted number of diversified transactions, probably referable to an unique administrative season. It is still premature to think to understand the whole administrative and bureaucratic organization of this presumable commercial agency, but it is already possible to put forward some preliminary remarks.

A close examination of seal impressions allow us to answer 2 basic questions: how many seal-owners were involved in the management of the “warehouse”, and how they shared the bureaucratic duties in relation to the different types of object sealed. To answer the first question it is necessary to determine how many seals had been used to stamp the sealings. The 93 sealings found at Lothal bear a total of 130 seal impressions: 63 on tags with single impression and 67 on tags with multiple impressions of different seals. For the great majority they had been made with standard Indus square seals with unicorns, but a seal with the elephant image was also used (L-161÷172), while other 3 impressions could represent the Indian short-horned bull or gaur (*Bos gaurus gaurus*) (L-189, 190, 191).

There is also 1 miniaturistic-like tablet with several Indus signs (repeated on 2 impressions of L-209, a not contextualized sealing). Three different seal impressions show geometrical patterns: a swastika-like motif (L-174), a grid pattern (L-175) and a labyrinth cross-like motif (L-173).³⁸

the discovery of “sensational” objects and structures such as those discovered in the west and without any interest for artefacts that apparently had no great antiquary value, like the terracotta sealings. Nevertheless it seems hardly conceivable that clusters like the one of Lothal could be completely and systematically ignored for mistake, negligence or indifference. Nowadays the HARP excavations in Harappa are organized on the base of the most modern methodologies and technologies applied on archaeology, but sealings were always rare and isolated cases, and no major clusters of terracotta sealings were so far discovered. Along these lines, we still owe to the work of Enrica Fiandra some clarifying examples. After years of excavation in all rooms of the Palaces of Festòs only a handful of terracotta sealings was found, but over 6000 were then discovered scattered within the structural filling under the floor of a single room (Fiandra 1975: 5).

³⁷ Fiandra & Pepe 2000.

³⁸ The seals with grid pattern and cross-like motif were part of the “warehouse” cluster and both occur on pegs-on-wall fastening (while L-174 was used to close the mouth of a small vessel). Thus, in the administrative event or period attested by the Lothal find people used in prevalence unicorn seals, but

A considerable number of these impressions were made using the same few seals, while others are single cases.³⁹ We identified 13 seals that occur more than once, establishing the record of a complex operational network: 6 seals were stamped both on tags bearing single and multiple impressions (total, 49 impressions); 2 seals on 2 couples of tags with single impression (total, 4 impressions); 3 seals twice on different tags (total, 6 impressions); 1 square stamp seal with no recognizable motif 5 times on the same tag (total, 5 impressions); 1 elephant seal once on 12 tags (12 impressions). Therefore these 13 seals alone account for not less than 76 impressions, while the remaining 54 were probably made with seals used only once. On the whole, the Lothal sealings retain the record of no more than 67 seals. This number might be perhaps reduced considering that about 10 of the 54 seal impressions we classified as made with non-recurrent seals could be deemed as less precisely interpretable because of their highly worn surface. If all these unreadable impressions (as an extreme hypothesis) had all been made with otherwise identified seals, the total number of seals on record would be reduced at a minimum estimate of 57 seals.

These arguments concern the whole assemblage of the Lothal sealings, but the central problem lies with the ones positively found within the “warehouse” blocks. As reported above, it was not possible to reconstruct with absolute precision the original association of the “warehouse” group. Nonetheless, combining the group inferred from Rao’ reports (**W**, **W**¹ and **W**² in Table 1), with the seal impressions analysis, we came to think that no more than 25-30 different seals had been contextually used to stamp the clay sealings found within the “warehouse”. Supposing that each seal corresponded to an official, as indicator of his responsibility in the checking operations, an equivalent number of peoples might were involved as seal-owners in the “warehouse” administrative management in a quite short period of time.

Now it is so possible to answer also the second question about the administrative structure and the bureaucratic procedures used at Lothal to manage the “warehouse”. Correlating the seal impressions (and so the seal-

there are also 2 seal-owners who used geometrical seals that had an adequate authority to warrant the sealing of doors and rooms.

³⁹ Asko Parpola published almost 20 years ago a first detailed study of the seal impressions recurrence within the Lothal sealings (Parpola 1986: 401-03 and Fig. 1). He focus most of all on the interconnections between sealings with multiple impressions, making only marginal mention to the presence of recurrent seals even on tags with single impressions.

owners) with the sealed fastenings, it seems that the Lothal “warehouse” was managed by several officials without a well structured hierarchy and without a clear roles specialization. In fact, only the elephant seal was used several times always (and only) to sealing the same fastening on wooden boxes. Looking at the most repeated seal (16 impressions), it is possible to observe that it was used alone to seal very different fastenings like small vessels (L-124), wooden boxes (L-125), leather bags (L-126), but even with other seals on the same tags to seal vessels (L-195, 197), grating-like structures (L-189 and 190), pegs-on-wall (L-206) and frames or lockers (L-193, 198).

These data suggest a poorly specialized management of the Lothal “warehouse”, with the noticeable exception of the elephant seal-owner, who might had a particular function, but not for this necessarily occupied a top position within the bureaucratic structure. In fact, we may expect that any hierarchical administrative institution should involve the same recurrent few seals used with a particular frequency to close lockers and doors (as containers of containers), depicting their owners as supervisors of the operations performed within the rooms they sealed. At Lothal there is no similar evidence, but 70 sealings are probably a too little amount to recognize such a distinctive recurrent pattern. It is also difficult to understand how many administrative cycles are represented the “warehouse” cluster. To put it simply, we might be dealing with a single administrative deed, with differences in seal use and frequency due to the parallel sharing of the whole administrative responsibilities. This explanation is plain, but it does not account for the large amount of different unicorn seals involved at the same time in the “warehouse” administration. Otherwise, it is possible that the assemblage was the result of the same administrative deed performed several times within a relatively short time, with continuous and repetitive actions, but also with occasional particular events. According to the last hypothesis, the elephant seal might had been used many times to close the same boxes, or even 12 times on the same one, while the unicorn seal-owners should made the most general sealing-duties, without any clear specialization. These hypotheses do not have deeply diverging implications for the evaluation of the basic bureaucratic procedures, but would imply a different amount of administrative records. In the first case we would be dealing with only one record corresponding to the whole group of sealings, while in the second case we should hypothesize several (adjoining?) deeds stored together.

In terms of bureaucratic procedures the distinction between tags sealed with single and with multiple impressions of different seals is immediately evident. At the present stage is not possible to conjecture about their functional and administrative differences, but we think that it is quite probable that the “multiple” sealings might have sealed rooms or containers that stored at the same time goods subject to the responsibility of different officials. In this way, each of these functionaries testified his sharing in the administration of the common storage-space and in the subdivision of the responsibilities in case any violation of the containers or subtraction of goods should happen. Accordingly, the sealings with a single seal impression would have been put on the fastening systems of rooms and containers that stored loads managed by a single official, or perhaps on warranty of the stored commodities.

Lothal and the Maritime Trade in the Arabian Sea

The 93 sealings found at Lothal undoubtedly represent only a very short stage in the administrative history of the site, or most likely a single bureaucratic deed. Nevertheless there are other indicators that could suggest the scale and the magnitude of the commercial activities that occurred at Lothal. Rao found in its excavations an anomalous number of rough seals in terracotta that seem to be made in haste, without any care for their aspect. These seals are always described only as a result of the poorly regional manufacturing technique manifested in general by the Lothal seal-makers, but they show distinctive features that characterize them otherwise.

In fact, only few of the standard Indus seals in steatite found at Lothal show the average quality of the ones found at Mohenjo-Daro and Harappa (see L-5), but they keep unchanged their basic features: even the clumsily made specimens carved or sketched within terracotta plates before firing, bear both the animal with its complete apparel and the inscription (see L-41 and L-15). The great number of the terracotta rough seals bear instead only few Indus signs hastily sketched on wet clay before firing or sometimes scratched after their baking (see L-52). A close examination of these seals pointed out a particular feature to verify as soon as possible with proper analyses: a thin gypsum-like coating is visible around several terracotta seals (particularly evident on L-95). At first sight it seems not due to post-depositional concretion, because the 6 well-shaped Indus signs on L-95 seem to be carefully carved in it before its firing, but it would need

a new verification. This thin layer might be applied to give a whitish hue to the seals, very similar to the fired steatite colour. A similar process would not a surprise within the Indus Civilization, because some distinctive Indus technologies, like faience and the etched carnelian beads, were probably invented at first to simulate rare materials like semiprecious stones, or shells.⁴⁰ On the other hand, unplanned exchanges and new extemporary partnership might have unceasingly created within areas of high intensity of trade and commercial transactions. Sometimes they might be carried out without any preventive preparation for the book-keepings practices and the relating administrative devices, particularly if foreign merchants were involved. It is so possible that such rough terracotta seals could be “on-spot” seals, made only to rapidly conclude unprepared transactions as prescribed by local standards and laws.

At Lothal were also found 4 administrative objects that demonstrate close connections between the Gulf of Khambhat in India and the opposite shores of the Arabian Sea, in particular with the site of RJ-2 at Ra's al-Jinz, at the easternmost edge of the Arabic Peninsula, in the Sultanate of Oman.

The most important of these artefacts from Lothal is undoubtedly a type of seal with the general shape of the Indus specimens, but exceptionally made in copper alloy, that bear the unicorn motif turning right and a short inscription with few Indus signs (L-44).⁴¹ A very similar seal, equally made of copper alloy, just more corroded, with the unicorn (turning leftside) and an Indus inscriptions, was discovered in the contemporary levels of RJ-2 (DA 8456).⁴² These are the two only specimens of Indus seals made of copper alloy, and this evidence alone might demonstrates how close were the links between the two sites. A current re-analysis of the X-ray images of the RJ-2 copper seal pointed out a striking resemblance of the inscriptions above the animal figures.

Although the characters are not fully preserved (particularly in the Lothal specimen) most probably the inscriptions were composed by a very

⁴⁰ According to M. Vidale, “the inventories of Indus objects often include ornaments and other items of the same type, similar to shape and function, but made of different materials of contrasting values: for example, terracotta bangles *versus* stoneware, faience or metal bangles, terracotta beads *versus* carnelian beads, Turbinella shell bangles *versus* bivalve shell bangles and so on. While an outsider might have perceived a set of ornaments simply as Indus, in the cities the aesthetic appeal and relative value of similar ornaments might have been an important media of social information and social comparison.” (Vidale 2000: 130).

⁴¹ Rao 1985: 306 and Plate CLIV C; Joshi & Parpola 1987: 247, L-44.

⁴² Cleuziou & Tosi 2000: 59-60 and Fig. 17.

similar sequence of Indus signs.⁴³ This suggests that the same merchant, commercial agency or family of traders, was simultaneously active on both shores of the Ocean. Secondly, from Lothal there is a rectangular stamp seal obtained re-cutting the lid of a steatite square box, with a roughly carved Indus inscription on the obverse and two concentric circles beside the square handle on the reverse (L-100).⁴⁴ This seal matches, in the decoration on the back and in the overall shape, another specimen in chlorite found at RJ-2, bearing on the obverse an anthropomorphic design, probably an “alliance” symbol (DA 12408).⁴⁵ A quite similar design was carved on a terracotta plate found at Lothal (L-109), suggesting other connections between these sites. The last connection concerns instead the sealings: at Lothal was in fact discovered a peg-on-wall sealing (L-175), with the impression of a square seal with a simple grid pattern, very close to the motive on a seal found at RJ-2 (DA 8546).⁴⁶ In this latter case, however, it is important to remember that grid patterns are relatively common also on seals found in other Indus sites. Thus, seals and sealings from Lothal and Ra’s al-Jinz stress the active role carried on by Lothal, in terms of “statal” enterprises or, perhaps better, of small independent commercial agencies, to the Arabian Sea trade. Furthermore, the famous Gulf type seal, with gazelles and a dragon, found on the Lothal surface shows that traders from Gulf ports had concrete economic interests at the mouth of the Sabarmati River.⁴⁷ All these data could also help us to explain the extraordinary amount of terracotta sealings found at Lothal, that might due to the requirements of a “global” Gulf trade system, connecting merchants with different backgrounds, who might have required the unanimously recognized *Transcultural Administrative Sealing System* (TASS) as guarantee of their commercial transactions. According to the same logic, the Indus weight scale was widely used as synonym of correct exchanges in the Gulf ports and in Mesopotamia itself, where was somehow wrongly labelled “Dilmunite standard”.⁴⁸ At the moment, failing other considerable discoveries within sites in the Indus Valley, the TASS adoption at Lothal, but also in other costal sites like Bagasra on the Gulf of

⁴³ Vidale & Frenez (forthcoming in press).

⁴⁴ Rao 1985: 313 and Plate CLXI D; Joshi & Parpola 1987: 261, L-100.

⁴⁵ Cleuziou & Tosi 2000: 60 and Fig. 16.4.

⁴⁶ Cleuziou & Tosi 2000: 60 and Fig. 16.7.

⁴⁷ Rao 1985: 312-13 and Plate CLXI B; Joshi & Parpola 1987: 268, L-123.

⁴⁸ Several Indus weights were also found scattered in various excavation lots at Lothal (Rao 1985: 560-65 and Plates CCLVII B – CCLIX B).

Kutch,⁴⁹ could be therefore considered as a further and fundamental expression of the complex, commercial and above all cultural,⁵⁰ exchanges system that joined peoples and cultures who lived face to face on the different shores of the Arabian Sea since immemorial time.

⁴⁹ Bhan *et al.* 2003.

⁵⁰ Edens 1992: 120.

References

- Bhan K.K. *et al.* (2003) "Excavation at Bagasra 1996-2003: A Preliminary Report", in *Man and Environment*, XXVIII-2, Pune, pp. 21-50.
- Bisht R.S. (1991) "Dholavira: A new horizon of the Indus Civilization", *Puratattva* 20, pp. 71-82.
- Cleuziou S. & M. Tosi (2000) "Ra's al-Jinz and the Prehistoric Coastal Cultures of the Ja'alān", in *The Journal of Oman Studies*, Volume 11. Ministry of National Heritage and Culture, Sultanate of Oman, pp. 19-73.
- Edens C. (1992) "Dynamics of trade in the ancient Mesopotamian World System", *American Anthropologist*, 94, pp. 118-39.
- Fentress M.A. (1984) "The Indus "Granaries": Illusion, Imagination and Archaeological Reconstruction", in K.A.R. Kennedy & G.L. Possehl (eds.) *Studies in the Archaeology and Palaeoanthropology of South Asia*, New Delhi, pp. 89-97.
- Feroli P. & E. Fiandra (1989) "Clay sealings from Arslantepe VI A: Administration and bureaucracy", in M. Frangipane & A. Palmieri (eds.) *Perspectives on Protourbanization in Eastern Anatolia: Arslantepe (Malatya). An Interim Report on 1975-1983 Campaigns*, Rome, pp. 455-509.
- Feroli P., E. Fiandra e G.G. Fissore (1989) "La gestione dei magazzini nei sistemi centralizzati", in *Origini. Preistoria e Protostoria delle Civiltà Antiche*, XIV, pp. 561-84.
- Feroli P. & E. Fiandra (2000) "Research into the Use of *Cretulae* in Ancient Administrative Systems: Problems regarding Orientation and Methods", in *Administrative Documents in the Aegean and their Near Eastern Counterparts* (Naples 1996), Turin, pp. 353-366.
- Fiandra E. (1975) "Ancora a proposito delle cretula di Festòs: connessione tra i sistemi amministrativi centralizzati e l'uso delle cretula nell'Età del Bronzo", in *Bollettino d'Arte*, 1-2, Roma, pp. 1-25.
- Fiandra E. (1982) "L'archeologia dei sistemi economici. Le prime forme di contabilità nei sigilli di 6000 anni or sono", in *Le Scienze*, 169, Milano, pp. 102-12.
- Fiandra E. (1982) "Porte e chiusure di sicurezza nell'antico oriente", in *Bollettino d'Arte* N. 13, Istituto Poligrafico dello Stato, Roma, pp. 1-18.
- Fiandra E. (2002) "La nascita della amministrazione", in *Le scienze dossier*, 12, pp. 10-15.

Fiandra E. *et al.* (2000) “Elementi per la chiusura delle porte nel Vicino Oriente antico e in Egitto”, in *Studi sul Vicino Oriente Antico dedicate alla memoria di Luigi Cagni*. Istituto Universitario Orientale, Napoli, pp. 283-307.

Fiandra E. & C. Pepe (2000) “Typology and Distribution of Administrative Indicators in the Eastern Residential Area of Shahr-i Sokhta during Period II (2800-2600 BC) - The Sealings”, in Taddei & De Marco (Eds.) *South Asian Archaeology 1997*, IsIAO, Rome, pp. 467-84.

Franke-Vogt U. (1992) “Inscribed objects from Mohenjo-Daro: Some remarks on stylistic variability and distribution patterns”, in C. Jarrige (ed.) *South Asia Archaeology 1989*, Prehistory Press, Monographs in World Archaeology, 14, Madison, pp. 103-12.

Frenez D. (in press) “I più antichi sigilli della valle dell’Indo. Ipotesi per una ricostruzione della traiettoria culturale”, in G. Bonora, F. Franceschi, S. Vinci (a cura di) *Atti del II Convegno Nazionale degli Studenti di Archeologia (Bologna, 18-21 maggio 2004)*, Bologna.

Halim M.A. & M. Vidale (1983) “Kilns, Bangles and Coated Vessels. Ceramic Productions in Closed Containers at Mohenjo-Daro”, in Jansen M. & Urban G. (Eds.) *Interim Reports Vol. 1. Reports on Field Work carried out at Mohenjo-Daro*. IsMEO/Aachen, pp. 63-98.

Hallaq D.M. (1994) “Les Sceaux des Grottes du Jebel el Akhdar”, in *Archives before Writing*, Torino.

Joshi J.P. & A. Parpola (1987) *Corpus of Indus Seals and Inscriptions, Vol. 1. Collections in India*. Suomalainen Tiedeakatemia, Helsinki.

Kenoyer J.M. (1998) *Ancient Cities of the Indus Valley Civilization*, Oxford University Press, Karachi.

Kenoyer J.M. (2000) “Early Developments of Art, Symbol and Technology in the Indus Valley Tradition”, in *INDO-KŌKO-KENKYŪ Indian Archaeological Studies*, 22, Tokyo.

Marshall J. (1924) “First Light on a Long-Forgotten Civilization”, in *Illustrated London News* (20 September 1924), pp. 528-532.

Meadow R.H. & J.M. Kenoyer (2001) “The Early Indus Script at Harappa: Origins and Development, in Olijdam E. (ed.) *During Casper’s Memorial Volume*.

Noguchi M. (2003) “New Viewpoint for the Study of “Indus Style” Seal”, in *INDO-KŌKO-KENKYŪ Indian Archaeological Studies*, 24, Tokyo, pp. 54-75.

The Lothal sealings

- Parpola A. (1986) "The Indus Script: A Challenging Puzzle", in *World Archaeology* 17.3, pp. 399-419.
- Rao S.R. (1979) "Lothal: A Harappan Port Town (1955-62), Vol. 1", *Memories of the Archaeological Survey of India, No. 78*, New Delhi.
- Rao S.R. (1985) "Lothal: A Harappan Port Town (1955-62), Vol. 2", *Memories of the Archaeological Survey of India, No. 78*, New Delhi.
- Shah S.G.M. & A. Parpola (1991) *Corpus of Indus Seals and Inscriptions, Vol. 2. Collections in Pakistan*, Suomalainen Tiedekatemia, Helsinki.
- Tosi M. (1991) "The Indus Civilization beyond the Indian Subcontinent", in M. Jansen & G. Urban (eds.) *The Forgotten Cities on the Indus*, Mainz, pp.111-128.
- Vidale M. (2000) "The Archaeology of Indus Crafts. Indus craftspeople and why we study them", *IsIAO Reports And Memoirs*, IV, Series Minor, Rome.
- Vidale M. (in press) "The Short-Horned bull on the Indus Seals: A Symbol of the Families in the Western Trade?", paper given at the "17th Conference of the European Association of South Asian Archaeologists", Bonn, 7-11 July 2003.
- Wheeler R.E.M. (1968) *The Indus Civilization*, 3rd ed, Cambridge University Press, Cambridge.

CAPTIONS

Table 1. Lothal sealings types with indication of the discovery contexts: **W**, sealings ascribed by Rao to the “warehouse” cluster; **W¹**, sealings stamped with seals that occur also in W; **W²**, ascribed by Rao to SRG3 with no recurrent seals; **O** ascribed by Rao to contexts outside the “warehouse”; **?** discovery contexts not determinable.

Graphic 1. Lothal. Sealings types according to the discovery contexts. (calculate in percentage).

Graphic 2. Lothal. Sealings types from the “warehouse” cluster according to the number of seals impressions (calculate in percentage).

Figure 1. Major sites of Mesopotamia, Iran, Arabia and South Asia during the Bronze Age.

Figure 2. Lothal. Site plan with indication of the excavated structures and location of the sealings cluster inside the blocks compound proposed by S.R. Rao as a “warehouse” (modified after Rao 1979).

Figure 3. Lothal. Door-locker sealings on pegs-on-wall (numbers referred to Joshi & Parpola 1987).

Figure 4. Lothal. Sealings on structures (numbers referred to Joshi & Parpola 1987).

Figure 5. Lothal. Sealings on structures, lockers and parallel canes (numbers referred to Joshi & Parpola 1987).

Figure 6. Lothal. Sealings on wooden boxes (numbers referred to Joshi & Parpola 1987).

Figure 7. Lothal. Sealings on pottery and other types of fastenings (numbers referred to Joshi & Parpola 1987).

Figure 8. Terracotta on-spot rough seals from Lothal and parallels between seals from Lothal and Ra's al-Jinz (RJ-2), (numbers referred to Joshi & Parpola 1987 and Cleuziou & Tosi 2000).

The Lothal sealings

Table 1

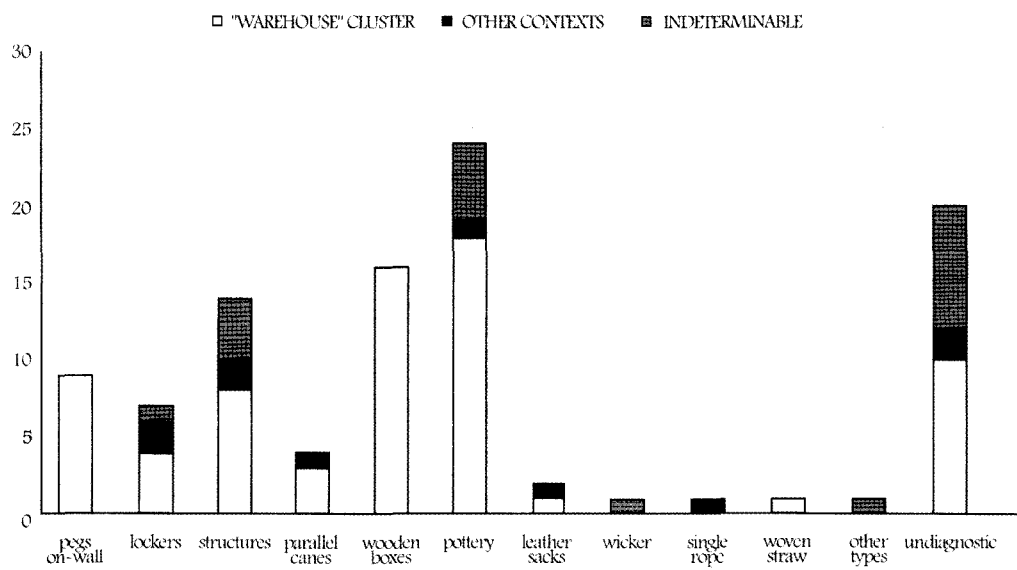
CISI No.	Impressions	pegs-on-wall	structures	lockers	parallel canes	wooden boxes	pottery	leather sacks	on wicker	on single rope	on woven straw	other types	undiagnostic
L-124	1										W		
L-125	1					W							
L-126	1							W					
L-127	1												W
L-128	1												W
L-129	1						W						
L-130	1		W ¹										
L-131	1												W ¹
L-132	1												W ¹
L-133	1						W						
L-134	1				W ¹								
L-135	1						W ¹						
L-136	1			W									
L-137	1						W						
L-138	1		W ¹										
L-139	1						W ¹						
L-140	1				W								
L-141	1		O										
L-142	1					W							
L-143	1				?								
L-144	1			W ²									
L-145	1		O										
L-146	1				O								
L-147	1						W						
L-148	1			?									
L-149	1			?									
L-150	2			O									
L-151	1											?	
L-152	1	W ²											
L-153	1												?
L-154	1	W ²											
L-155	1	?											
L-156	2												?
L-157	1	W ²											
L-158	1			W									
L-159	1						W						
L-160	1												W
L-161	1					W							
L-162	1					W							
L-163	1					W							
L-164	1					W							
L-165	1					W							
L-166	1					W							
L-167	1					W							
L-168	1					W							
L-169	1					W							
L-170	1					W							

Dennys Frenez - Maurizio Tosi

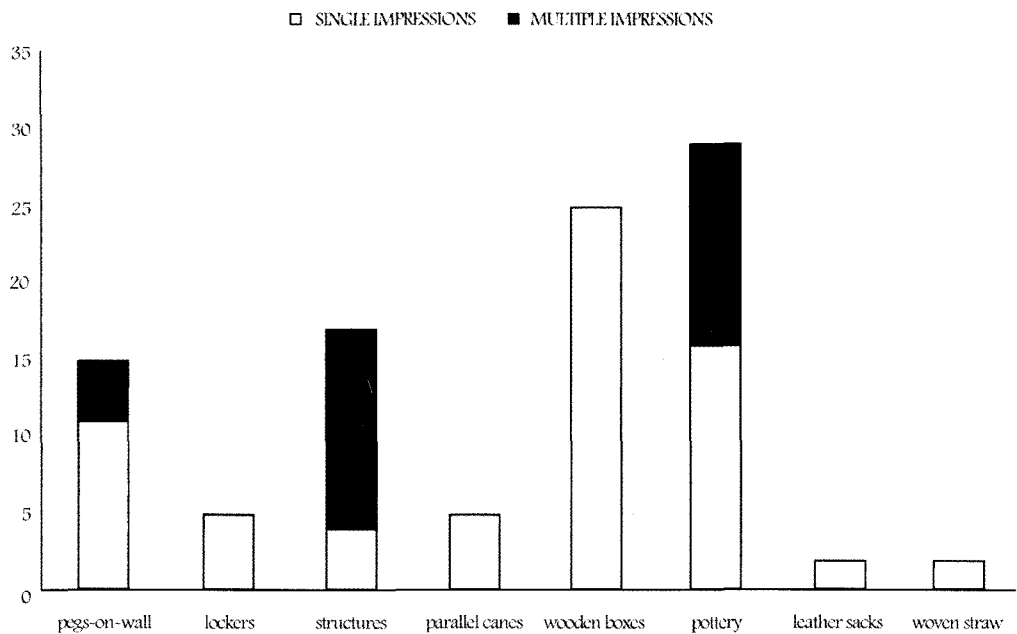
CISI No.	Impressions	pegs-on-wall	structures	lockers	parallel canes	wooden boxes	pottery	leather sacks	on wicker	on single rope	on woven straw	other types	undiagnostic
L-171	1					W							
L-172	1					W							
L-173	1	W											
L-174	1						O						
L-175	1	W											
L-176	1						W ²						
L-177	1						W ²						
L-178	1												?
L-179	1	W ²											
L-180	1				W ²								
L-181	1						?						
L-182	1												?
L-183	1												?
L-184	1												?
L-185	1												?
L-186	1						W ¹						
L-187	1						?						
L-188	3						?						
L-189	4		W										
L-190	3		W										
L-191	2		W ¹										
L-192	2	W ¹											
L-193	3		W										
L-194	2						W ¹						
L-195	2						W ¹						
L-196	2						W						
L-197	2						W ¹						
L-198	2		W ¹										
L-199	2												W ¹
L-200	2						W ¹						
L-201	2												W ¹
L-202	2												W ¹
L-203	2												W ²
L-204	2								?				
L-205	2												O
L-206	2	W											
L-207	2		W										
L-208	2									O			
L-209	2			W ²									
L-210	2			O									
L-211	3					?							
L-212	2						W ²						
L-213	2			?									
L-214	2						?						
L-215	5							O					
L-216	2												O

The Lothal sealings

Graphic 1



Graphic 2



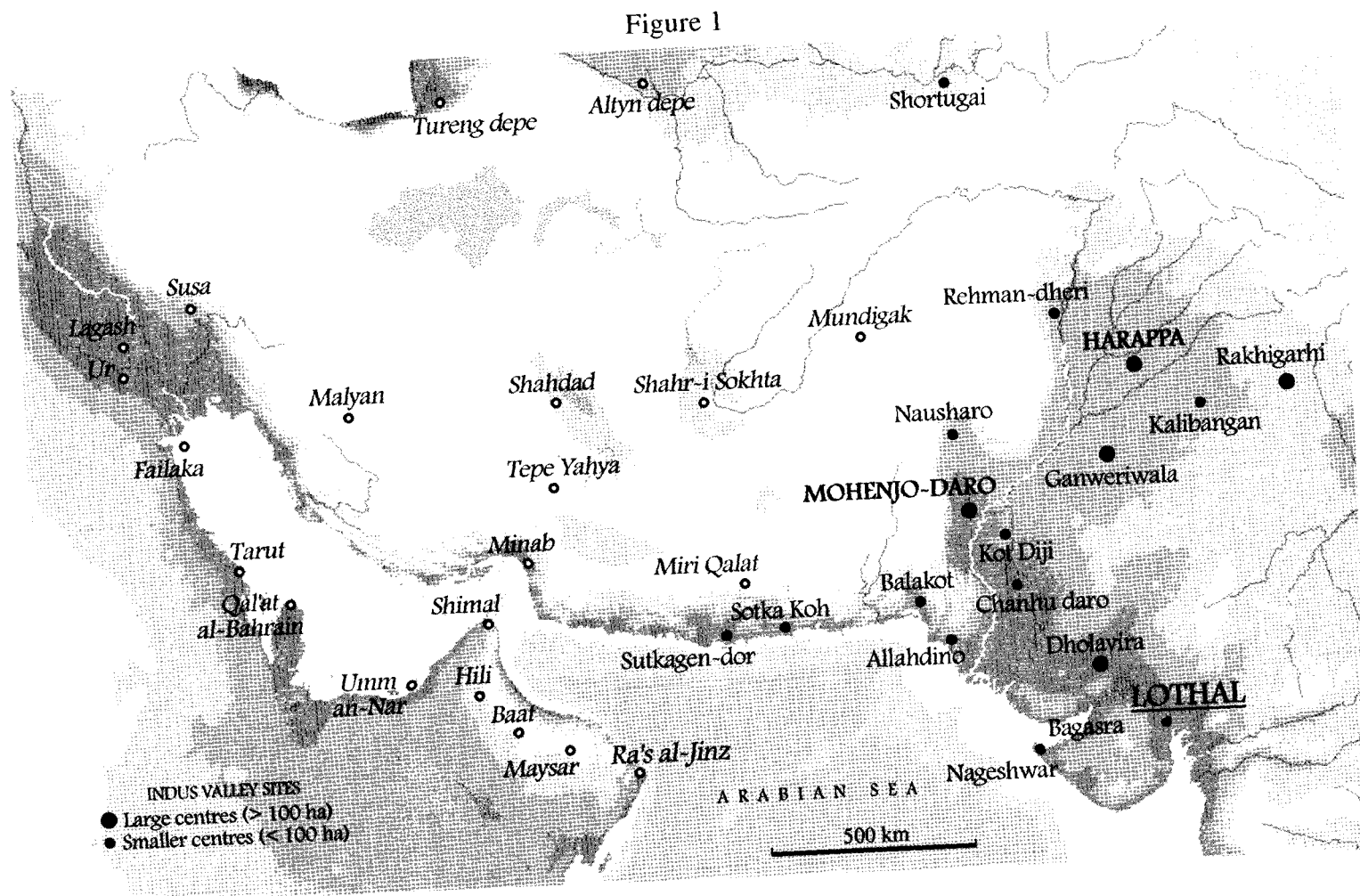


Figure 2

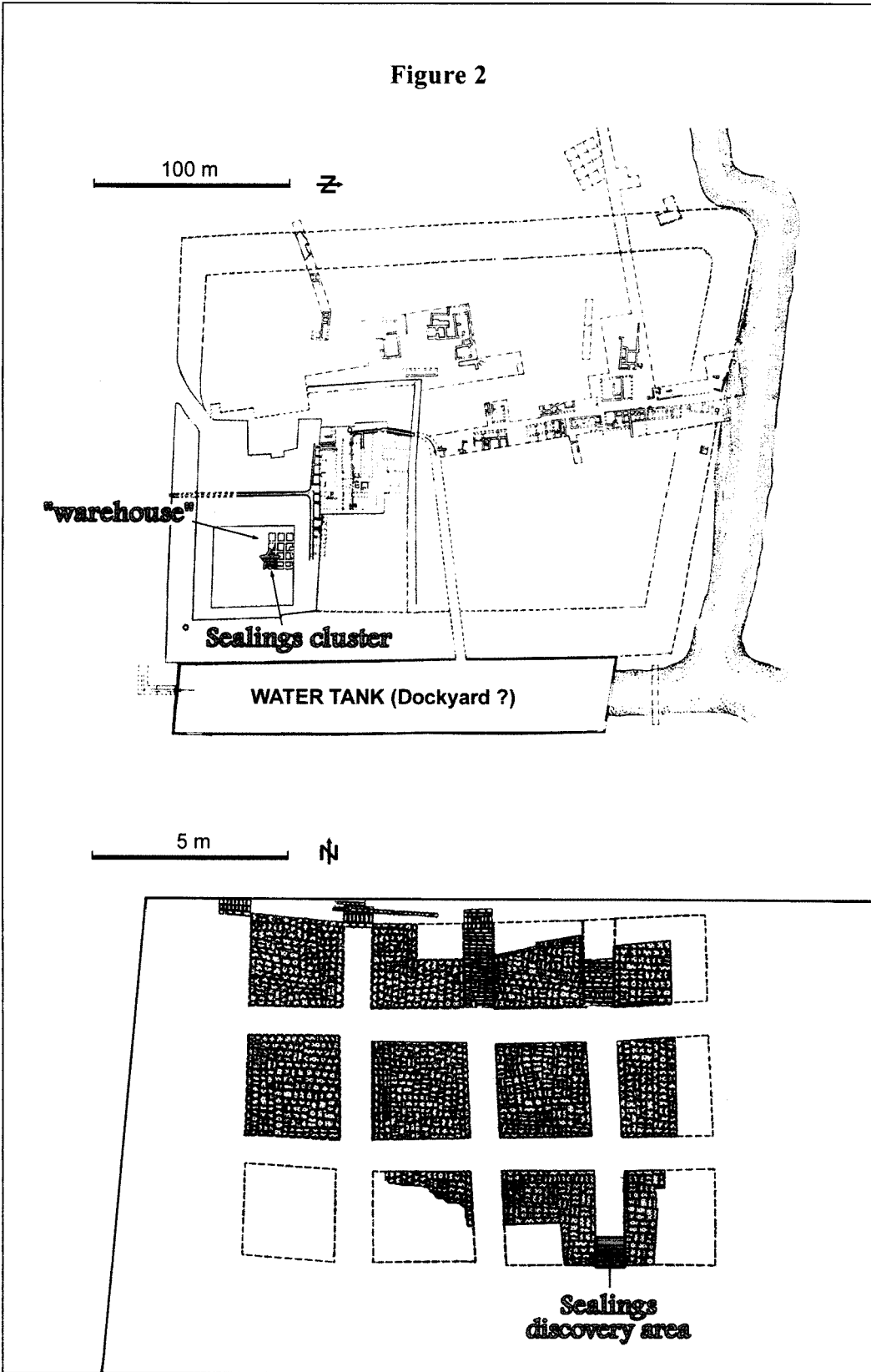
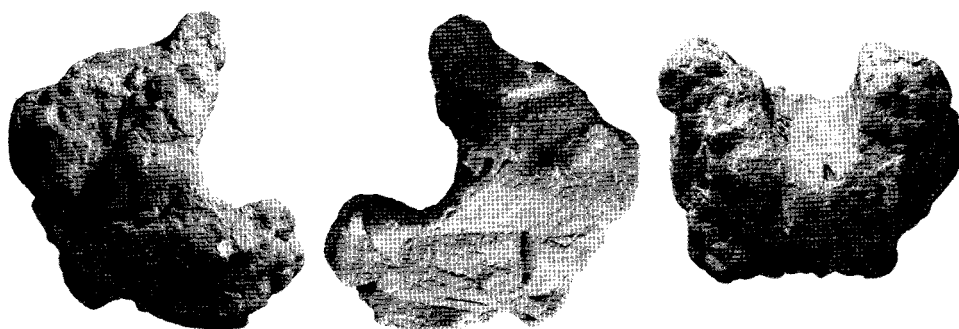


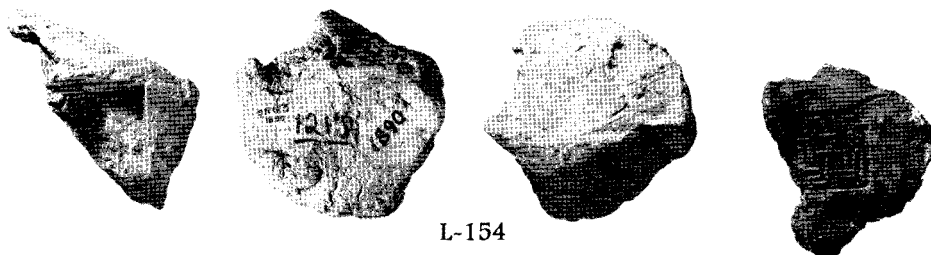
Figure 3



L-206



L-179



L-154

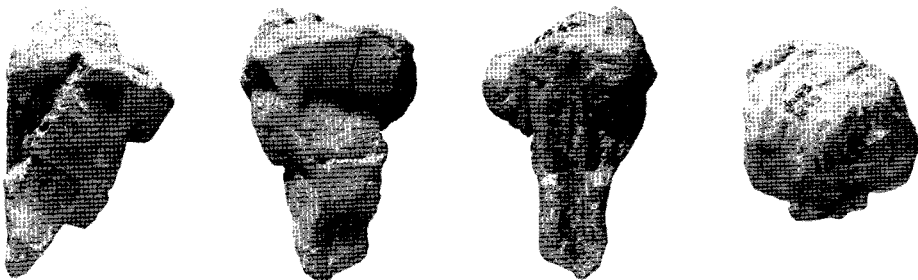


L-175

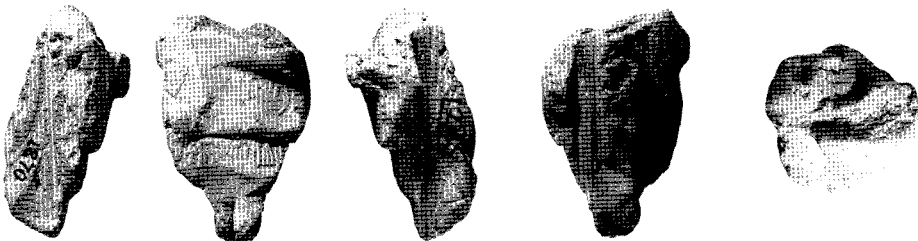
L-173



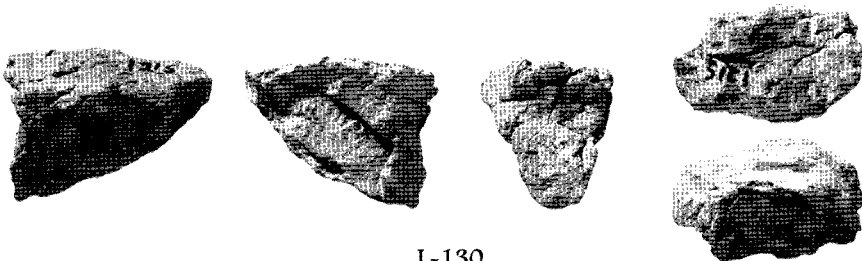
Figure 4



L-189



L-190



L-130



L-145

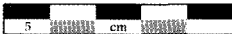


Figure 5

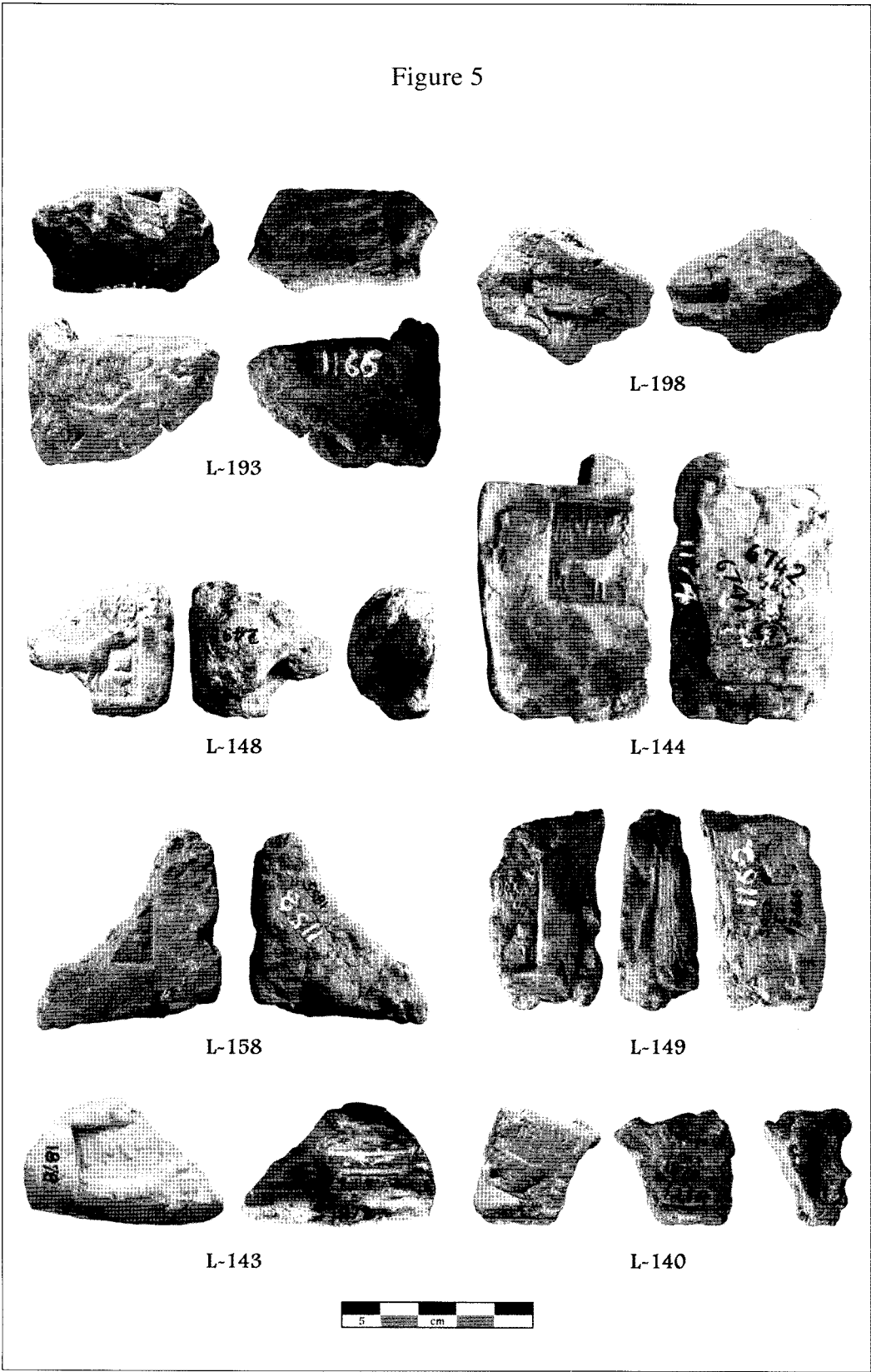


Figure 6

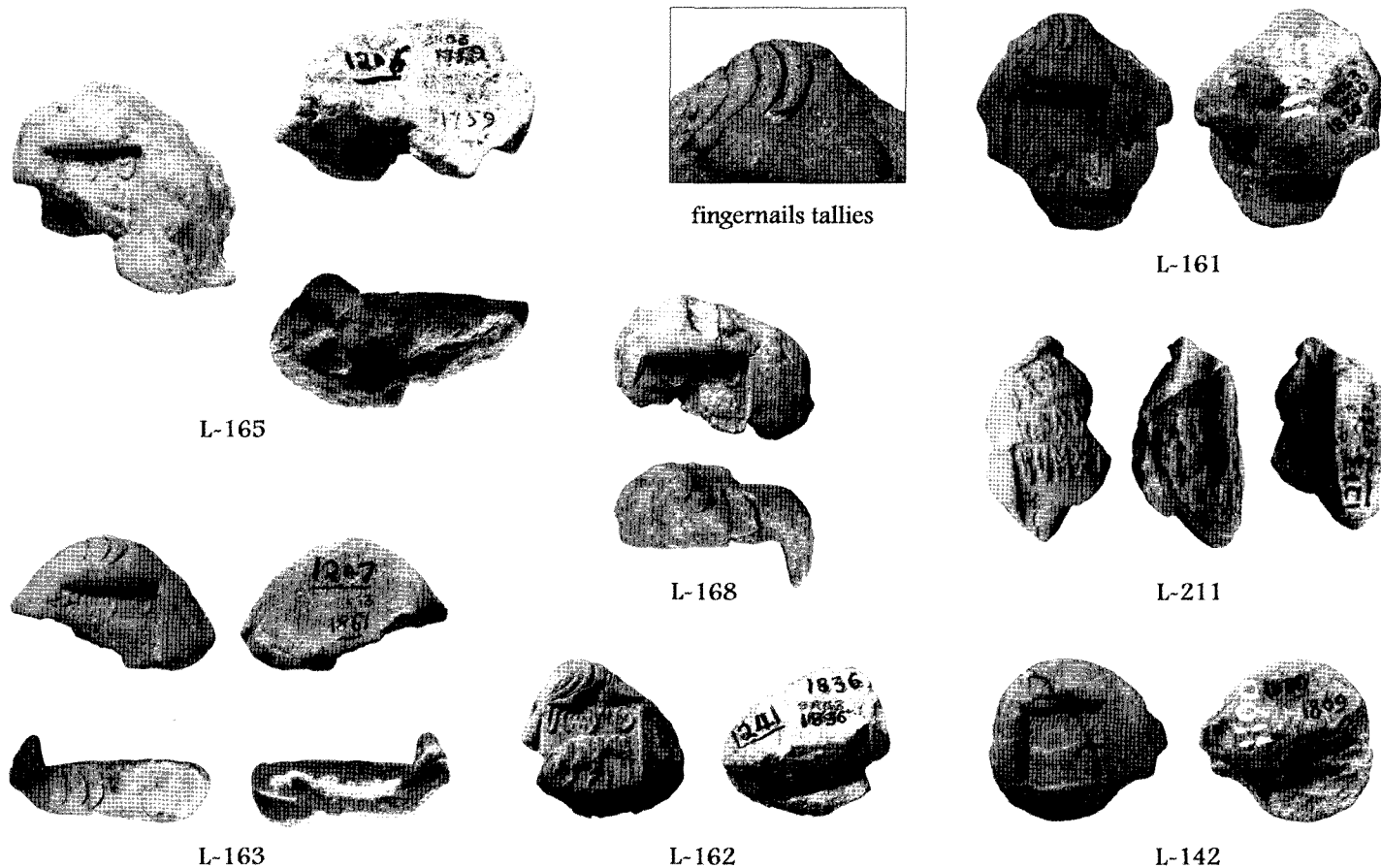


Figure 7

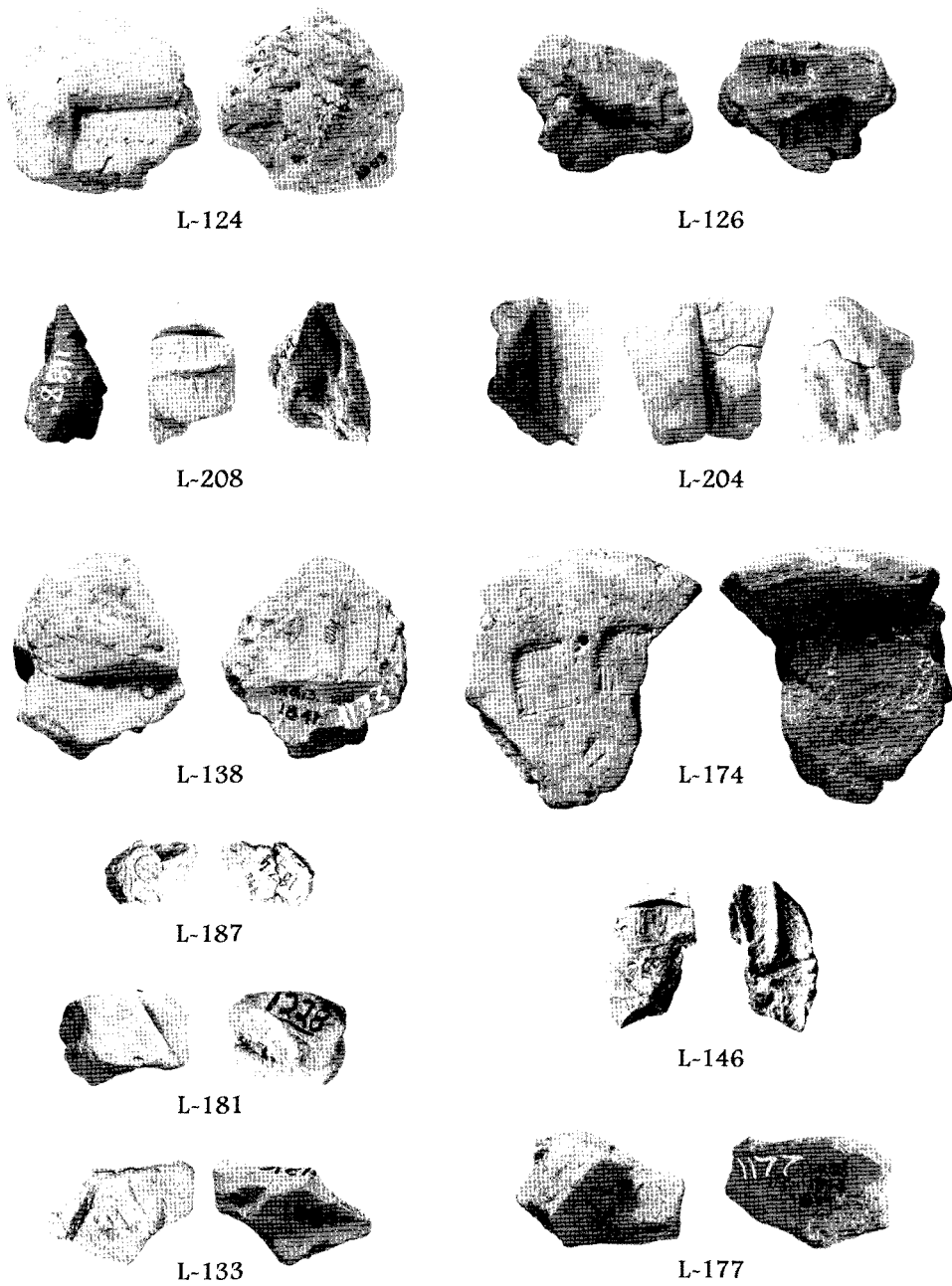


Figure 8

