

## STOREHOUSES AND STORAGE PRACTICES IN OLD NISA (TURKMENISTAN)

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**Abstract:** The article analyses the body of evidence related to the storage and administration of food in Parthian Nisa, according to the results of the recent excavations of the Italian Archaeological Expedition in Turkmenistan. A new corpus of clay sealings, *khums* (big jars) and ostraka came to light in the so-called SW Building, which, together with the previously known findings from the other buildings of Nisa, gave way to some speculations about the storage and administration practice within the Arsacid citadel. The spatial distribution of the khums gives information on the function of each building and their single rooms; the texts on the ostraka inform us on the nature and quantities of the food stored in the khums; the various ways the sealings were impressed on clay suggest some ideas on the number and roles of the officers involved in the administration of the storehouses, and perhaps on the nature of the goods stored as well. In general, the findings from the latest excavations provide fundamental information on the economic life of the citadel and of the Parthian society as well. Despite the lack of scholarly debate on such issues as related to the Parthian and Central Asian world, the authors try to interpret the evidence from the Nisa excavations, and give a preliminary reading of the data from the new and old excavations in the Arsacid citadel.

**Key words:** Parthian archaeology, Parthian economical history, Old Nisa, storage and administration practice, sealings.

### 1. Storehouses at Nisa (C. Lippolis)

Despite the rich archaeological evidence supporting the existence of storehouses, systematic record-keeping and storage practices in Old Nisa (Turkmenistan), to this day there has been no study on the architecture of Nisa's functional building complexes, nor on the storage and distribution practices employed within them.<sup>1</sup> The attention of schol-

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<sup>1</sup> Diakonoff/Livshits 1976–2001: on more than one occasion, the explanatory notes accompanying the transcriptions refer the reader to a yet-to-be-published “commentary.”

ars has always been monopolised by the ceremonial buildings, even though the presence of extensive storehouses and storage areas is, in fact, a meaningful feature of the site.

Andrei N. Bader's precious, albeit preliminary analysis<sup>2</sup> of the historical data contained in Nisa's economic records (ostraka) gives us an idea of the useful information, and seeds of future research, that might be drawn from a deeper philological and historical investigation of these inscriptions in the light of existing and new archaeological data. This paper offers an overview on storage practices in Old Nisa, taking into consideration both the already published material and the new data that has recently come to light in Old Nisa.

The latest Italian archaeological investigations have effectively demonstrated the great significance of the presence at Nisa of large built areas (and possibly "open" areas, as well – see below) used for storing food, both liquids and solids. Excavations all around the central monumental complex (i.e. the Red Building, Tower Building, Round Hall and Square Hall) have identified extensive areas that were used for storing incoming and outgoing foodstuffs. Within this context, it is not our intention to give careful consideration to every single building-phase and destination of the various buildings in Old Nisa. Rather, we will only consider their topographic position and original purpose.

Excavations conducted by the JuTAKE in the northern part of the citadel uncovered part of the so-called *khumkhana*.<sup>3</sup> These structures lie immediately to the east of the Square House,<sup>4</sup> which in a late phase was turned into a storehouse, albeit for furnishings and precious items rather than food products.<sup>5</sup> From this area come the majority of the Nisean ostraka, real "labels" describing the contents of the large jars that were stored there.

The area between the fortification walls and the Square House has never been systematically investigated. The ground surface is here quite flat and apparently free from buildings, a fact that may have contributed to the relative lack of attention given to it by archaeologists. In addition, the entire sector was used as a burial site in the (late?) Islamic period, and the numerous pit graves, which can often be identified on the ground only by the presence of small piles of stones, cut the older Arsacid layers. At the end of the 1950s, the Russian archaeologists opened two small trenches close to the northern section of the fortifications and brought to light large walls (built in mud bricks of the typical "Parthian" size: 41–42 × 41–42 × 12 cm). The considerable thickness of these walls suggests the presence of a building of monumental scale. In 2014, the Italian team opened a further test trench (sector CQ1: around 7.70 m × 6.30 m: Fig. 1) close to the north-eastern corner of the Square House, revealing a large wall in bricks and pakhsa (i.e. beaten clay; the total thickness is around 2 metres) along which hollows for ten or so large storage jars were arranged.<sup>6</sup> We cannot rule out the possibility that these structures

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<sup>2</sup> Bader 1996.

<sup>3</sup> Or, rather, "khum-buildings," in which the term "khum" – here, and in general in the Russian academic literature relating to Nisa and Central Asia – refers to large storage jars (see below).

<sup>4</sup> Pilipko 2001, 163–171.

<sup>5</sup> For a functional reading of the Square House over the course of its various phases of construction, see Invernizzi 2000.

<sup>6</sup> This trench, too, revealed the presence of numerous Islamic graves, quite feasibly from a late period. In the four graves recently excavated, the body was facing south/south-west (i.e. towards the Ka'aba in Mecca). Unfortunately, the complete absence of grave goods makes a precise dating difficult.



Fig. 1. Old Nisa, general map with excavation areas (elaborated by C. Bonfanti)

originally formed part of the same complex of storehouses, to the east of the Square House (and so-called *severnoe vinohranilišče*) that was partially excavated by the Soviets in the 1950s and '60s. Its "U" shape, the product of subsequent building phases, could in fact represent the southern half of a larger rectangular complex with rooms arranged around an open-air court.<sup>7</sup>

Another area characterised by the presence of numerous khums is that of the "North-East Building" (Fig. 1), so called for its location in relation to the central complex. This area, which has only been partially surveyed, is distinguished by wide courtyards, with buildings along the north/north-east side that displayed large storage jars. These structures were most likely added in a subsequent phase of building.<sup>8</sup>

A third area in which numerous hollows/housings and remains of storage jars have been recorded lies along the south-eastern inner side of the fortification walls, where the Italian team opened test trenches in 2007. Immediately next to the walls (Area A, Figs. 1 & 2), a large number of khum-housings were arranged rather haphazardly into a layer of earth, gravel and blocks of virgin soil. The original purpose of this area remains uncertain, particularly given the apparent absence of walls: only very scant remains of structures in pakhsa have been uncovered in the south-western corner of the excavation. Nevertheless, the large number of khums registered for this area, and its distinctive earthworks (maybe an artificial levelling) seem to suggest a particular function, quite likely storage. Moreover, it cannot be ruled out that there once existed light, perishable structures, of which no traces remain.<sup>9</sup>

During the Italian team's recent excavations (2007–2011), remains of khums – sunk into the ground and again apparently separate from any built structure – were uncovered at the top of the eastern slope of the larger depression in the central part of the site (Area G, Fig. 1) and close to the south-eastern corner of the fortress. In this latter zone (Area E, Fig. 1), several khums – completely sunk into the ground and with blocks of pakhsa bordering their rims<sup>10</sup> – were arranged without any order and apparently were

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<sup>7</sup> In fact, the plan that has been proposed for these northern storehouses is unusual, insofar as this type of building normally has a rectangular/square layout. The hypothesis that there might be a "courtyard," to the north of the double row of rooms so far uncovered, has been forwarded before, following the Soviet excavation of a trench (8.5 m × 4 m) that failed to reveal any trace of walls in that area (Pilipko 2001, 165 and 168, Fig. 122).

<sup>8</sup> Pilipko 2001, 175–185; Pilipko 2008.

<sup>9</sup> It is important to keep in mind that this sector features no accumulation strata. Immediately below a thin layer of deposits, which is itself just below ground level (in all, between 10 cm and 30 cm in depth), we find the virgin soil or the artificial soil and gravel fill that served to level the area. It is not clear whether the entire south-eastern sector was levelled and cleared by human interventions during a late (?) period (with the consequent removal of any existing structures), or whether the bad state of preservation of the remains can be attributed exclusively to natural erosion. For a preliminary note on this issue, see Lippolis/Messina 2008, 53–55.

<sup>10</sup> Some of the khums found sunk into the ground were still "sealed" with stones or blocks of pakhsa. Unfortunately, however, analysis has not identified substantial traces of substances that might identify their contents with any certainty. Nor in other areas of the site did analysis of the soil from the inside of the jars provide the expected information. For example, vine pollen was detected in hardly any of the khums, which is very surprising given that the majority of these jars were used for storing wine. It is not currently possible to establish whether this anomaly, which must be investigated further with new samples, is due to particular conditions of conservation, soil composition, subsequent reuse of the vessels, or simply to chance.



Fig. 2. Area A, view from the east

not related to any built structure. A substantial number of these khums had their mouths sealed with stones (Fig. 4). The interiors of these vessels did not yield finds of particular interest, although it is worth noting that one of the jars contained bone material, which was possibly human. This suggests that at least a few of these jars may have been reused in a later period and this area changed into a graveyard.<sup>11</sup> In this case, too, it is important to recognise that a more precise reconstruction is made very difficult by the limited extent of the excavation.

In Area F, further to the north-east (Fig. 1), remains of mud walls have been found together with large jars sunk into the floor.<sup>12</sup> This area, which has yielded a sizeable quantity of Parthian pottery, was revisited in a late period (Islamic) with interventions that certainly disturbed the ancient layers, preventing us from defining an accurate chronology of the unearthed structures.

Finally, we mention Nisa's south-western corner (Figs. 1 & 5), where between 2007 and 2015 Italian excavations brought to light a large, functional complex that included storehouses.<sup>13</sup> The complex was only partially uncovered by the team's investigations, as it extends further east than the excavated area and along the southern walls.

Two main structures can be distinguished here, conventionally known as the "South-Western Building" and the "Eastern Building." These are linked together and form a single complex, which is the result of several phases of building likely dating from the sec-

<sup>11</sup> The southern sector of the site, together with the northern area and the area between the central complex and the Square House, were used during the late Islamic period as graveyards.

<sup>12</sup> Lippolis/Messina 2008, 59–61.

<sup>13</sup> For a preliminary report, see Lippolis 2013.



Fig. 3. Area E, view from the south

ond century BC to the first century AD. The quadrangular structure at the south-western corner of the walls – whose interior part, comprising a row of rooms around an open courtyard, presumably corresponds with an older nucleus – had the functional characteristics of a storehouse, although some of the spaces within it must have been used for other productive activities.<sup>14</sup> On the other hand, the structures of the Eastern Building seem to belong to a wing used either for residential purposes or for official functions, though here too, isolated areas have been identified that were used for storing khums.<sup>15</sup>

The area of the South-Western Building housing the storehouses featured a roughly squared plan, with elongated rooms arranged around a central courtyard. A second row of rooms, on the north and east sides, was added during a later phase of construction, effectively increasing the storage space (some of the rooms in the new, eastern wing were

<sup>14</sup> *Ibidem.*

<sup>15</sup> The hypothesis concerning the building's purpose is based, first and foremost, on the presence – at the southern edges of the building as we currently know it – of a row of three rooms (not visible on the schematic plan of Fig. 5), each of them displaying a pair of column bases. This architectural detail is more fitting for official or even residential purposes than for a storage area. With the exception of two rooms on the eastern side of the building, there is no trace of other housings for jars inside the building.

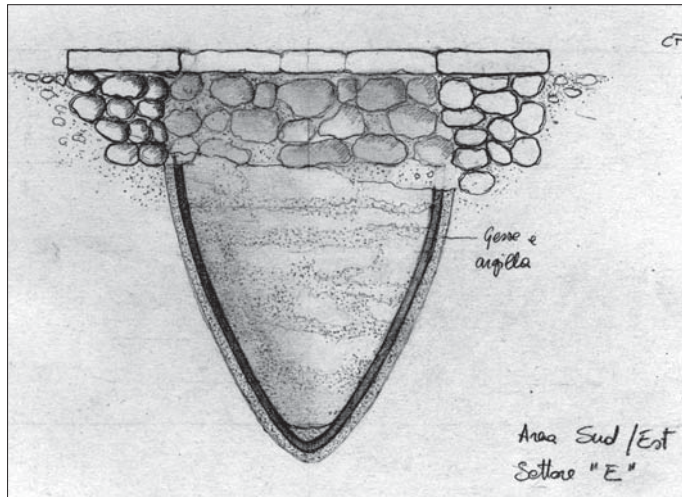


Fig. 4. Area E, section of a khum sunk into the ground (drawing C. Fossati)

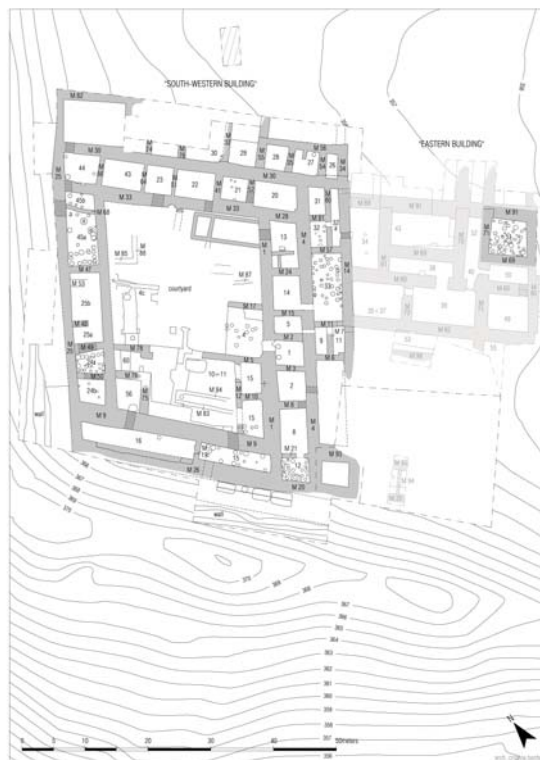


Fig. 5. "South-Western" and "Eastern" Buildings (2007–2014 excavation) with distribution of jars or housings found in the buildings (drawing C. Bonfanti)



Fig. 6. South-Western Building, room 1: reused khums

used to store khums) and leading to the construction of a new building (it is likely that the Eastern Building was constructed at this point). The presence of two or three floor levels within these rooms, and the evidence here and there of extensive collapses, not to mention frequent repairs and restorations, testify to the long and complex building history of this area of the citadel. This is unsurprising, since it is clear, from its location, that this area served the central monumental complex directly.<sup>16</sup>

It is true that isolated khums have been unearthed, within the building, usually in the corners of the rooms. However, almost all of these are concentrated in just a few areas of the western, southern and eastern wings. A number of khums are also found at the centre, in the courtyard that would later be partially closed off by a subsequent phase of building (still within the Parthian period). Some of these jars contain burnt residues and were placed upside down: a clear clue as to how they were reused. Indeed, it was the top half of the khum that was reused; turned upside down and fixed or supported on the floor, it could be used as an oven for cooking and preparing food (Fig. 6).

Very few complete khums remain in place. We owe this situation in part to the collapse of the buildings and the effects of time, but also to the ancient practice of the recovery and reuse of these jars. Traces of this “ancient” recycling can also be seen in the pits dug alongside the original khum housings (Fig. 7), or where the lower part of the jars is still partially sunk into the floor (their edges level with the floor), the top part having been sliced clean off.

The total number of the khums in the south-western complex is revealing. The sum of the jars and of the housings recorded during the excavations is around 200, although

<sup>16</sup> Based on the most recent excavation data, for all that it may be particularly difficult to identify the remains of structures in this area, parts of wall belonging to the South-Western Building can still be identified just 15 metres from the southern facades of the Round Hall and the Tower Building.



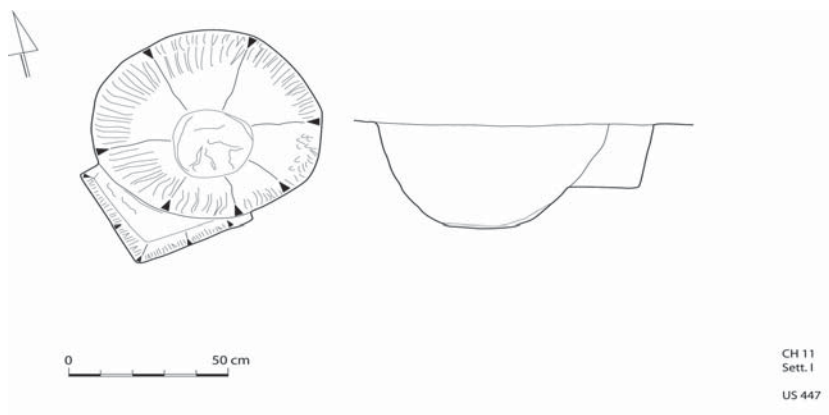


Fig. 7. South-Western Building, room 45a: housing of a khum (plan and section)

this figure obviously relates to the total number of vessels spread across the building's various phases of construction.

The arrangement of khums within the rooms does not seem to strictly follow a particular scheme. In general, they are laid out starting at the corners and/or the sides of the rooms, and continuing inwards. They may even nearly fill a room completely. Fig. 8 shows the arrangement of jars as identified in room 12. The variations in grey tone correspond with the main phases of storing. Other cases, such as room 15, display khums arranged in a less rational manner, with some of them positioned away from the walls.

Given that they are frequently cut into by later pits, damaged by collapses or refilled artificially, attributing the several hollows for housing khums to particular phases of the buildings' use is no easy task. Moreover, the substitution of one vessel with another – with the opening of another hole in the ground, which might cut or simply lie close to a previous hollow – may in fact occur after only a brief interval.

Furthermore, both the shape of the khums and the way they were arranged in a room can vary. For a general classification of these vessels by type and an account of how they were produced, the studies by Masson<sup>17</sup> and Vdovin<sup>18</sup> are still worthy of attention, despite certain aspects of the production process still needing to be clarified. The very nature of the clay used makes it clear that manufacturing such large, heavy vessels in a single piece would have been impossible. On the basis of the observations made by the Russian archaeologists, we can say that the production of a khum would require the use of a composite technique: the central section and “shoulder” were modelled by hand, while the rim was made separately to be attached afterwards. The lower section, in contrast, was always made on a wheel. On that subject, we should bring the reader's attention to the seams that can still be identified on some fragments, indicating where the

<sup>17</sup> Masson 1953.

<sup>18</sup> Vdovin 1984.

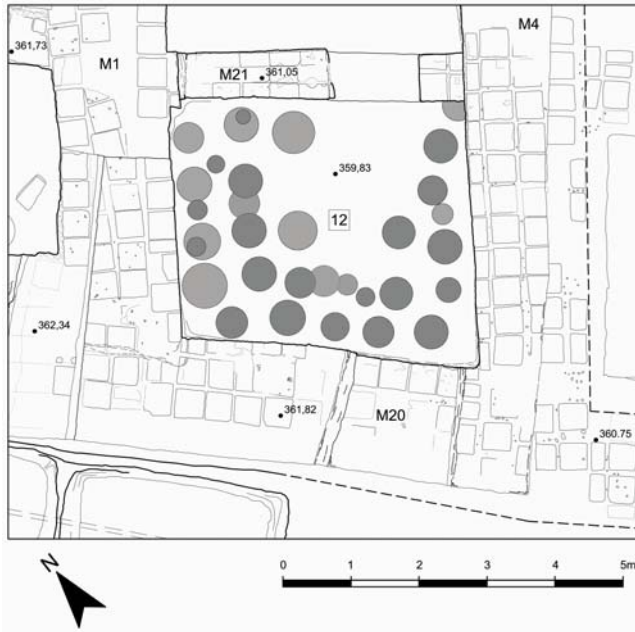


Fig. 8. South-Western Building, room 12 with distribution of jars (drawing C. Bonfanti)

separately prepared sections were joined together.<sup>19</sup> Assembly would take place at a later stage, possibly after the clay had partially dried and hardened but while the edges were still moist, and certainly before the final firing.<sup>20</sup> The seams, which were subsequently masked on the inside with a covering of fine clay (and on the outside using a burnishing or smoothing technique), can be discerned on a number of khum fragments that still fit together perfectly and which bear clear finger impressions and bumps at the points where two sections were brought into contact and joined, using the fingers to press them together (Fig. 9).

We leave out here further details on the technique and the morphological types, considering now the two main ways to store these containers. The khum could be sunk into the floor or on a raised base of clay/bricks (the latter being the case, for example, in the northern *khumkana* sector). Most khums were buried up to about one third of their height, but there are also cases of khums that were sunk in their entirety, with their rims

<sup>19</sup> See G. Ceccarini's forthcoming "Parthian period storage jars from the South-West Building in Old Nisa," in: G. Affanni, C. Baccarin, L. Cordera, A. di Michele, K. Gavagnin (eds.), *Proceedings of Broadening Horizons 4. Conference of Young Researchers Working in the Ancient Near East, Egypt and Central Asia*, BAR International Series, Oxford. The same author proposes a preliminary classification of khums in *Nisa Partica. La ceramica dagli scavi della missione italiana 2007–2012*, Università degli Studi di Torino (unpublished degree thesis, 2012).

<sup>20</sup> To date, no kiln or other device for firing ceramics has been found at Old Nisa (and this is obvious if we consider that Old Nisa is a ceremonial complex). As such, information regarding this process is entirely lacking.

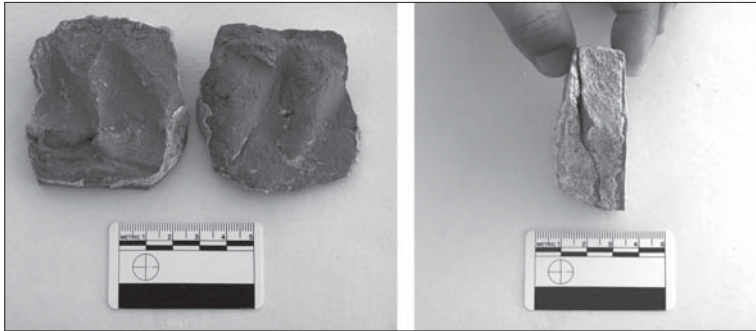


Fig. 9. Seam of a jar with finger imprints



Fig. 10. South-Western Building, room 45a: a jar sunk into the floor and sealed with a baked brick



Fig. 11. South-Western Building, khums in room 45a after the removal of the floor

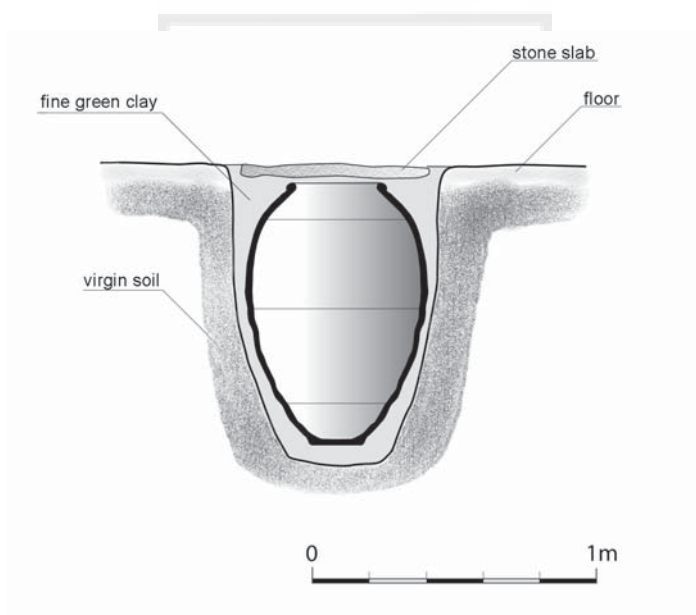


Fig. 12. Section of a khum sunk into the floor (drawing C. Fossati)

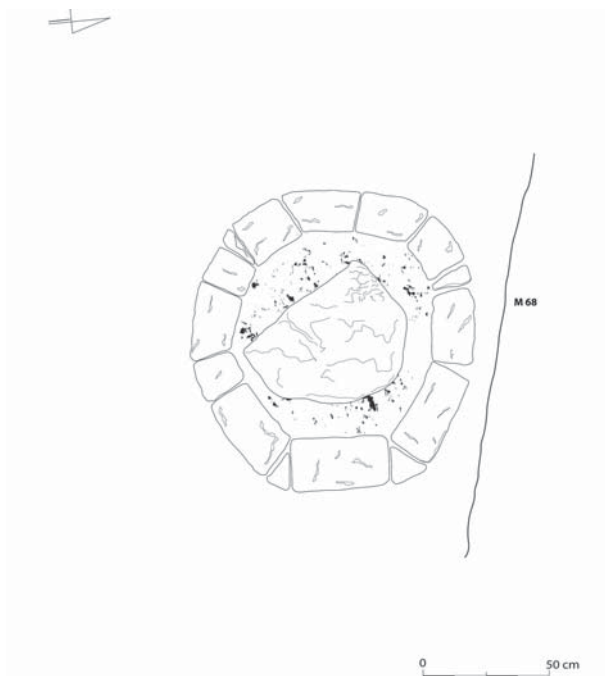


Fig. 13. The mouth of a khum sunk into the floor of room 45a, encircled by a ring of mud bricks and sealed with a stone

loosely embedded in the floor (Figs. 10, 11, 12). In both cases, they were stoppered using terracotta elements (bricks, tile fragments or purpose-made round lids<sup>21</sup>) or stones that had been cut to shape and smoothed. The type of stone used for this purpose was a grey-green sandstone largely used at Nisa for architectural elements (plinths, column bases, friezes and so on). It is a soft, rather friable stone, from which thin slabs (2–3 cm), either rectangular or circular, can be cut with relative ease.<sup>22</sup> Fragments of an unbaked clay lid were also discovered in 2014: this was a disc with a rough handle in the shape of a lump of clay with deep finger impressions to provide grip. Furthermore, the use of other materials, such as matting or fabric, to provide a hermetic seal cannot be excluded (remains of a rough fabric were discovered in room 15 beside a group of jars). Lastly, the khum could be sealed with pieces of unbaked clay into which impressions were made with various sorts of seals (see below, part 2).

The hollows housing the khums are round, and just wider in diameter than the walls of the jar. The walls of these cavities often yield traces of a greenish, fine-grained clay, which occasionally contains chalk inclusions. This mixture evidently served to better anchor the container in the ground, and at the same time protect it from damp. In such

<sup>21</sup> As in the case of a fragment of a terracotta disc around 50–55 cm in diameter, found in 2011.

<sup>22</sup> There are, however, examples of stones of other types being used; they are roughly shaped and arranged to close up the khums.

cases, when khums were entirely sunk into the virgin soil, the gap around them was wider (even as much as 10–15 cm; Figs. 10, 11, 12), while the mouth of the jar might be surrounded by mud bricks (half-bricks), as was the case of a khum in the oldest floor in room 45a (Fig. 13).

It is not yet possible to establish whether this difference between fully or only partially sunk jars is related to their specific contents (liquid or solid as they might be). Analysis of samples taken from the inside of these containers has not thus far provided clear information indicating with any certainty a single variety of produce for all of the fully buried jars.<sup>23</sup>

The majority of data concerning the contents of these large storage jars and the management of the storehouses comes from ostraka. As is widely known, these usually follow a standard formula (although in reality there is a shorter variation and a longer one) of an essentially economical nature, with an indication of the type of the incoming product, its quantity and the specific estate on which it was produced (with occasional mention of who delivered and recorded it). Infrequently, however, a date or a note on the quality of the produce (particularly in regard to wine), its provenance or destination might also be inscribed (or preserved). The great majority of the ostraka record consignments of wine, which could vary widely in size. Wine came from lands that either belonged to the crown or were obliged to furnish tributes (on an annual basis?), from temple properties, or from private individuals (cavalry commander, treasurer, etc.).

With only a few isolated exceptions, all the ostraka come from storehouses and sometimes are found beside the khums they are related to (at times inside the hollows in which the jars were sunk). It seems possible, on the basis of the actual contents of the jars, that the ostraka were used as temporary labels and subsequently discarded, erased or reinscribed.<sup>24</sup> In some cases, there are additions and corrections to the original text, but these revisions were made only a short time after the original inscriptions, and frequently by the same hand. It is likely, as has already been suggested,<sup>25</sup> that it was the practice in these storehouses to “tidy up” or substitute the ostraka on a regular basis, and perhaps even some of the jars themselves.

In the South-Western Building the ostraka come almost exclusively from storage rooms (Fig. 14). Some of the ostraka coming from its eastern side report a date between the years 141 and 162 of the Arsacid era (i.e. 107–86 BCE), which may well be the period in which these premises were used.<sup>26</sup>

<sup>23</sup> The two samples taken from entirely sunk khums that have been analysed have yielded no trace at all of seeds, nuts or pollen grains, perhaps an indication that this type of vessels was simply used for storing water. All the same, some of the sunk jars at Ulug Depe seem to have been used to store solid foodstuffs: Lecomte 2011, 237.

<sup>24</sup> There are numerous examples of “labels” describing jars that had been removed from rooms or buildings that had collapsed. It is the text on the ostrakon itself that puts it in this category. There are even “labels” for empty jars.

<sup>25</sup> Bader 1996, 255.

<sup>26</sup> Should this be the case, the buildings further to the west (in other words the original nucleus of the South-Western Building) would have to date from before the last decade of the second century BC. For the time being, this remains a hypothesis to be examined in the light of a definitive stratigraphic investigation of the complex as a whole.



Fig. 14. South-Western Building, room 33, view from the north

Even though there has not yet been a systematic investigation of the onomastics and the principal roles of the individuals mentioned on the ostraka, a preliminary analysis<sup>27</sup> identified the toponyms of at least five vineyards, while 45 villages and/or properties around Nisa have also been recognised. Other information concerns the organisation of the storehouses. For example, ostrakon n. 2577 tells us that in the year 72 BC one particular “wine store” contained a total of 6351 *mari* of old wine. In the same year, according to ostrakon n. 2576, a so-called “royal treasury” counted 2933 *mari* of new wine.<sup>28</sup> Another, undated ostrakon (n. 2624) tells us that at Mihrdatkirt, 160 jars of wine were stocked in the so-called “new storehouse,” while another 316 jars were to be found in the “second storehouse.” Sixteen jars were recorded as being empty, giving a total of 500 jars used for wine alone.<sup>29</sup> Unfortunately, it is not clear which and how many storehouses were being used at the same time within the citadel.

<sup>27</sup> Bader 1996.

<sup>28</sup> 1 *mari* is generally held to equal 9.32 litres.

<sup>29</sup> The dimensions of the khums are relatively consistent. However, there are differences, and it is unclear whether these are to be attributed to variations in usage (a few ostraka mentioning jars of oil were recently found beside fragments from medium-large containers), to different producers or to the period of production.

The ostraka also provide occasional indications of the wine's quality. In addition to the familiar references to "old wine" and "new wine," we also find – as might be expected – wine that had turned vinegary ("gone sour"). However, there is also mention of "eatable" wine or wine that was "newly fit to drink,"<sup>30</sup> "inferior" wine, "fortified wine" and wine that may have been set aside for ageing ("intended for store"). Besides, we find here one or more varieties of "colourless" wine (white, rosé?) mentioned.<sup>31</sup> Wine could be transferred (or decanted) from one jar to another, or new wine could be added to old to improve it. The existence of various varieties of wine is not surprising if we consider the significant quantities that flowed into Nisa every year. Furthermore, these same ostraka regularly distinguish between those who simply managed estates and vineyards ("wine-factors"), and the owners of the land ("wine-growers"). Meanwhile, references to a "wine-dresser," and even a "wine-collector" or "vintner" (ostrakon n. 1677) remain more doubtful.

Other types of foodstuff that were present in the storehouses, such as flour, oil (vegetable or animal?), flax seeds, sesame seeds, raisins, wheat and barley,<sup>32</sup> are mentioned more sporadically.

As far as processes of record-keeping, checking and sealing within the storehouses are concerned, from the inscribed ostraka we can infer the presence of scribes,<sup>33</sup> a head-scribe, individuals responsible for applying seals ("seal-setters"), storehouse "keepers" (who are occasionally, but not always, the same people who apply the seals), "cup-bearers" and "accounters." We are lucky in a few instances to know these individuals' names, but we have no further information about the precise nature of their duties. It is possible that individual ostraka occasionally use different names for the same functionary, resulting in a distorted picture of reality.

Indeed, on the basis of the ostraka inscriptions, we might infer that the system of storing and redistributing produce was, in some respects, rather complex, whereas the picture that emerges from the physical data is one of relatively simple record-keeping practices.

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In general, the average capacity of these large, pear-shaped containers, which would frequently measure 120–130 cm in height and up to 80 cm in diameter, could be as much as 280–300 litres.

<sup>30</sup> Definitions in inverted commas, such as "eatable" and so on, are taken from Diakonoff/Livshits 1976–2001. Some of these definitions, in fact, seem to be rather unusual. The lexicon on the Nisean ostraka, in effect, is one of those aspects that needs to be more systematically reviewed and investigated, also in light of the new data now available.

<sup>31</sup> It is possible that this is, in fact, a reference to a type of beer.

<sup>32</sup> Barley, for example, is mentioned in a well-known ostrakon that records the coronation of a king (ostrakon n. 2-L): Arsak, the king, son of grandson (2) of Arshak. Accounted (3) this offering – 2000 e(phas) of barley. If the conversion rate of 1 epha to roughly 35 litres is correct, this equates to 70,000 litres, a not insignificant quantity, even considering that the density of barley is substantially lower than that of liquids.

<sup>33</sup> We ought to bear in mind, in addition to this reference to record-keeping scribes, that some ostrakon inscriptions are thought to be scribal exercises.



## 2. Storage practices (N. Manassero)

At this point, it is necessary to switch our attention to the analysis of the clay sealings brought to light by the Italian excavations of 2007–2014. These were found exclusively in the south-west sector. However, the fact that the other areas excavated by Italian teams have not yielded a single such sealing may be due to the limited extent of the test excavations carried out in these sectors, in addition to the precarious state of the buildings, where the debris is few and the later use probably affected the original stratigraphy.<sup>34</sup>

It is important to point out that identifying such clay sealings in the field presents something of a challenge since, due to their poor state of conservation, they may no longer bear clear seal impressions, and above all, because the clay they are made from is the same type and consistency as that used to make the bricks used at the site. As such, the sealings would be found amongst rubble composed of the same material. We could add that, unlike many other examples of inventories in which fire, at the expense of more perishable documents, actually contributed to the conservation of clay sealings by effectively firing and hardening them,<sup>35</sup> the clay sealings of Nisa have reached us unfired. After all, use of the South-Western Building did not cease because of a fire, but because of the collapse of certain sections – which can, in certain cases, be attributed to earthquakes – and the consequent collapse of the buildings themselves. As a result, the clay sealings from the South-Western Building are especially fragile. They are often broken into pieces and covered with concretions of the same consistency, which makes the process of cleaning them and discerning their shape even more difficult. The seal impressions are invariably faint and indistinct due to the natural erosive effect of the soil in which the clay sealings are deposited, and frequent immersion in water as witnessed by the loamy accretions that are often evident in individual examples. The result is that observations on such objects are largely subject to uncertainty. Readings and interpretations can only be considered definitive in a small number of cases, while much of the remainder is subject to speculation. A number of the iconographic variations found in these seal impressions have been studied elsewhere.<sup>36</sup> Our intention with this paper is rather to gather a few observations on the morphological characteristics of the clay sealings that have been found to date, and to consider their purpose. Thus, we hope to contribute to the study of the methods of produce-storage and administration employed in the building currently being excavated; we believe that only by examining different categories of artefact can these methods be clarified.

In spite of the difficulties we have described, since 2009, 129 specimens of clay sealings, of various shapes and sizes, have been identified in the excavations in the South-Western Building. For the most part, this figure comprises sealings bearing seal impressions. However, there is also a small number of clay fragments that lack seal impressions

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<sup>34</sup> Outside of areas A, E and F, no seal impressions have thus far been recorded, not even in the small test trench opened north-east of the Square House. Here, khum hollows and khum fragments and various ostraka have been found underneath the Islamic tombs, which leads us to suppose that the vessels must have been sealed at some point.

<sup>35</sup> Boussac/Invernizzi 1996.

<sup>36</sup> Manassero 2010, and Manassero, forthcoming.

but bear imprints of one sort or another – pieces of wood, cord, corners – that confirm their identity as sealings.

At this point, it is worth pausing to offer a brief clarification in regard to terminology, since there are a number of terms that are used in different ways by different authors when discussing similar artefacts. In the following pages, I will use the term *clay sealing* or *sealing* generically to refer to pieces of clay bearing an *imprint* of the sealed object on the reverse, and a *seal impression* on its external surface. In line with the terminology that has prevailed in recent years,<sup>37</sup> we can say that this latest inventory from Nisa does not contain true *bullae*, such as those of the Sasanian period. *Bullae* are globular sealings pierced by a hole, in which the document being sealed would be inserted. Nor are there *tokens*, which is to say clay lumps with a seal impression at the centre that seal the ends of the string with which a document is closed. On the contrary, all of the clay sealings in the “new” inventory, insofar as we can ascertain both shape and function, can be described as sizeable lumps of rough clay, the majority lacking any clear shape, that feature a band of purified clay into which seals would be impressed (see below). These clay blocks are, at times, surprisingly large, and frequently contain gravel inclusions, which are sizeable in their own right (up to 3 cm). This leads us to suppose that such clay sealings might seal objects with large surfaces, and not documents. The fact that they are always found together with a large khum, as discussed earlier, allows us to state with some certainty that they were used almost exclusively as seals on this sort of container, and potentially on other vessels of a more perishable nature. Indeed, it is worth stating that the majority of these clay sealings were found either inside khums, or immediately beside them – next to the base, if the khum was still in place, and in the khum hollow if the jar itself had been removed. Other clay sealings have been found in layers of rubble, but always close to khums.

As far as the reverse side of these clay sealings – that is the side that faced the sealed object itself – is concerned, on more than a third of the specimens (49) it is either missing, or has an indistinguishable imprint. A similar number have a smooth surface with impressions made by a round-sectioned rope (14), are pierced by a hole (17), or bear the imprint of some sort of plant material characterised by a flat shape and distinct, parallel fibres, probably canes or wooden slats. In some cases, however, it is difficult to differentiate between the piercings left by ropes from those made by burrowing insects, after the artefact lay buried. Imprints that appear to have been made by knots have been identified on a number of items – S36/09 and S5/10 for example – but it is unclear to what sort of object these seals might have been attached. Lastly, a sizeable number of specimens (33) bear imprints made by other objects. In some cases, these can be attributed to a very gently curving edge, presumably the rim of a khum, or in rare cases, to the straight edge of some sort of box. In some instances, these imprints suggest a slightly concave surface of considerable size. We cannot offer a more detailed definition of these imprints. They vary in shape, but can all be attributed with some certainty to the walls or rims of khums or their lids. In two specimens (Fig. 15, a photograph of S20/12), a gently curving, stepped outline can be made out. This is undoubtedly the imprint left by the rim of

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<sup>37</sup> Cf. Rostovzeff 1932, but also Harper 1973; Göbl 1976; Frye 1977; Huff 1987; Lerner/Skjaervø 1997, and Lerner/Sims-Williams 2011.



Fig. 15. Imprint of a khum's rim on S20/12



Fig. 16. Likely an "appended sealing", S22/12

a khum. Examples of clay sealings thought to have been used to seal doors, or rather to seal locks, are rare and, in any case, usually questionable. Such cases include S22/12, a cone-shaped lump whose purpose is uncertain, but which was certainly not used on a khum. It is more likely that it belongs in the category of "appended sealings" (Fig. 16).

Turning to the outward-facing side of the clay sealings, we see that the majority (79) can be grouped together in the same category. We can figure a process where a large mass of clay is spread out, and in many cases smoothed carefully with a baton, on top of which is applied a flattened band, like a belt, of variable thickness. Impressions are made in this band, using a seal. It is difficult to say how these bands were flattened out, but in one case (S10/12) the band is pierced lengthways, from one end of the preserved part of the band to the other, by a hole left by a piece of rope. It seems feasible that a piece of string made from a perishable material was entirely covered with a paste of clay and chalk, stretched right across the surface to which the seal was being applied, and flattened to make it stick. It is quite reasonable to envision the end section of a rope that held some sort of lid in place on the mouth of the khum. In many cases (31), it appears that the seal was pressed into the mass of coarse clay, rather than the band of purified clay that surrounded the string. We should note, however, that this conclusion is debatable, since occasionally only small portions of the surface around the seal impression are preserved and therefore it is not objectively verifiable that such a band is even present. In only three cases, including the aforementioned S22/12, can we be sure that the clay sealing is globular, and could not have had a flattened band. In these cases, we may wish to place the artefact in the category of “appended sealings.”<sup>38</sup> Finally, there are 15 samples of pieces of clay that bear the imprint of a corner, rim or rope on the reverse – from which we can infer that they are the body of a sealing – but on which there is no sign of a seal impression. It should not be forgotten that the statistics are especially subject to variation due to the miserable condition of these artefacts, which are badly fragmented and incomplete. However, careful evaluation of the complete specimens, those that can be assessed with any confidence, does tell us with a degree of certainty that nearly every clay sealing sealed either a broad, concave surface, feasibly that of a khum, or in rare cases a flat surface, which could be that of a wooden box. Only in the cases of the three “appended sealings” might we point to clay sealings from Nisa being used for documents, bags or pegs used for keeping doors closed.

Fortunately, Nisa itself has provided another collection of clay sealings, those from the Square House, which has been known about for some time and its various categories studied in some depth.<sup>39</sup> It is thanks to these very studies that we can carry out meaningful comparisons regarding the issues discussed above, and venture a hypothesis concerning the management of the storehouse in question based on analogous features and differences between the two inventories of artefacts. The type of clay sealing described earlier – a sizeable volume of rough clay crossed by a band of purified clay that bears one or more seal impressions – seems to be exclusive to the South-Western Building. The certainty of this assessment may be undermined by the methods of collection and preservation used during the excavation of clay sealings by the JuTAKE.

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<sup>38</sup> In this regard, globular clay sealings of this kind, which in two cases bear simple pinch-marks and finger-imprints, recall another category of artefacts found in the same areas of the South-Western Building and many other parts of Nisa: balls of clay and chalk, whose surfaces bear marks made by fingernails, and impressions made by coins. For a number of observations regarding the possible pertinence of such artefacts to the realm of seals, rather than the ritual sphere to which literature usually assigns them, see Manassero 2013, 47–48: the author will discuss his personal view in greater depth in the final publication of the excavations.

<sup>39</sup> Mollo 2001.

Time and again, at the Square House, we see only the seal impressions and a minimal portion of the surrounding clay being preserved, giving rise to the suspicion that the additional, more cumbersome parts were discarded. The overriding impression is that the aim, during the excavation phase, was to preserve the smallest portion required to document the seal impression, which is consistent with the overriding interest displayed by the Russian academics in the sealings' outer surface, rather than the inner surface and the imprints left by the sealed objects themselves. All the same, even amongst the Square House sealings there are some discernible examples of flattened bands with rows of seal impressions, although these are smaller than those found at the South-Western Building. In addition, there is greater variation in the imprints left by the sealed objects on the reverse of the clay sealings in the Square House, which bears witness to a wider variety of stored items. Indeed, although a few fragments of plant fibre have been found together with clay sealings in the South-Western Building, sealings bearing the imprint of fabric, and likely, therefore, to have been used on a sack, are entirely absent. Nor are there any of the L-shaped sealings that can confidently be attributed to boxes' sealings, although there is a good number of flat-backed sealings which could feasibly be placed in that category. As such, we may propose, albeit in a preliminary manner, that there was a clear difference in the nature of the objects stored and sealed in the Square House and those stored and sealed in the South-Western Building – various types of container in the former and almost exclusively khums in the latter.

These conclusions are also supported by examining the collection of clay sealings found at Ulug Depe, a site that is close to Nisa physically, although it dates from an earlier period. It is located about 150 km east along the same range of Kopet Dagh mountains at whose feet Nisa was built. Here, recent French excavations have brought to light a significant inventory of clay sealings. As in Nisa, these were always found together with khums.<sup>40</sup> In a number of cases, they bear the clear imprint of the rim of a jar on the reverse, as we have seen in our own examples. The French archaeologists have even managed to make out the micro-stratigraphy of the clay within individual specimens and understand the methods with which the clay was applied. It is clear that the conditions in which the Ulug Depe sealings were preserved were much better than those at Nisa, where similar observations proved impossible.

We can therefore conclude with some confidence that the clay sealings of the new inventory from Nisa were used for sealing khums, and very occasionally wooden boxes or storage sacks stored together with jars. As such, it appears that the seal impressions bear witness to the work of functionaries employed in managing the storage of produce contained almost entirely in khums – namely wine and oil, going by the information provided by the ostraka.

We will now switch our attention to a number of issues that are rarely given consideration in the literature on this subject. We will examine the seal impressions in more detail – with a particular focus on the methods used, their shape, number and arrangement, but with little attention to questions of iconography – with the aim of determining what sort of information they can give us. We hope to learn something not only of the identity of the functionaries charged with the task of applying the seals, but also of the contents

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<sup>40</sup> Xin/Lecomte 2012.

of the khums and how they were managed. At this point in time, it is possible to take accurate notes on such features, but we can do little more than speculate on their meaning until more complete data from the running excavations or the ostraka inscriptions might provide a key to their interpretation.

For the most part, the seal impressions on the clay bands are arranged in a single row, but they also appear in double, triple and, in very rare cases, in quadruple rows (Fig. 17). They are usually neatly aligned and arranged at regular intervals, but in a few rare cases we find impressions that touch or just barely overlap. Similar arrangements of seal impressions are found in the inventory from Shahr-i Qumis,<sup>41</sup> which is likely the other Parthian capital mentioned by sources as Hekatompylos, and therefore on a similar sociocultural level to Nisa. The arrangement of seal impressions on one specimen (S33/09: Fig. 18) may be boustrophedonic, as it has one impression set on a separate row underneath the main one. In this case, it is difficult to find a clear reason for such an arrangement, insofar as it would be obvious that the extended row of impressions would end up filling the width of the band, and the space available to extend the following row would have been enough. The most plausible explanation, to these authors' eyes, is that an arrangement of this sort implies a method of counting, perhaps comparable to the concept of an abacus, but in any case one that communicates quantitative information about the contents of the khum. This theory requires that we consider the very arrangement of the impressions, whether on single, double or multiple rows, together with the number of impressions, as established codes, capable of furnishing detailed information about the contents of the container, without the need to break the sealing to check. For example, it may be that the number of impressions on a single sealing corresponds to the number of units of produce stored in the khum, for instance the *mari* mentioned on the ostraka. If not, it may tell us something about the date the seal was applied.<sup>42</sup>

The impressions on S10/2010 may encourage a similar interpretation. At its centre, it bears a simple groove, made lengthways, which would have been easy for anybody to counterfeit, and which therefore undermines the integrity of the contents, or rather, makes it impossible to detect a break-in and subsequent, counterfeit, resealing. A similar artefact was discovered at Shahr-i Qumis,<sup>43</sup> where, in place of the single rectangular groove, there are two, perpendicular to one another, forming an equally straightforward and falsifiable cross-shaped design. We might surmise, in this case too, that this mark indicates a numeric figure relating to the contents of the container, rather than to the functionary. We should therefore consider whether analogous features of the counting systems used at Nisa and Hekatompylos might exist. From the little information we have on Central Asian practices, it would appear that these might grow out of traditional Iron-Age systems, as attested by the example of Ulug Depe.

One point should be added regarding the lack of sophistication in the images we have just described. The act of sealing does little to hinder the breaking of the seal. At most, it leverages the magical, apotropaic quality inherent to any seal to ward off those who

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<sup>41</sup> Bivar 1982.

<sup>42</sup> We would also do well to keep Indonesian sealing practices in mind, specifically the fact that the number of repetitions of an impression is in proportion to the importance of the letter's sender, cf. Teh Gallop 2006.

<sup>43</sup> Bivar 1982, 175: Fig. 5: E3.



Fig. 17. Multiple rows of impressions of seals on S3/13



Fig. 18. Particular rows of impressions on S33/09

might break it illicitly. The main purpose of the seal is, rather, to provide evidence of a breach after it has occurred.<sup>44</sup> As such, logic would dictate that a seal should bear clear, unequivocal images that are ideally difficult to counterfeit. However, in the case of the new collection from Nisa, we have found that not only are many images of a sort that would be easy to counterfeit, but the impressed surface is occasionally entirely smooth. In some cases, it could be that the image has been erased by the effects of time and the conditions in which the items were preserved; but in others the surface is perfectly smooth, despite the crisp, precise and unworn edges surrounding it, which leads us to conclude that such smoothness is intentional. The existence of impressions that are either extremely simple or lack any sort of representation at all leads us to suppose that in a given context, it was not necessary to individualise a sealing to identify who applied it. This clearly suggests a situation in which the management and administration of the storehouses was particularly straightforward, with a single functionary dedicated to the task of applying seals. As such, we can also suppose that the only function of the seal impressions was to bear witness to the very act of applying the seal, and therefore to the integrity of a container's contents. It would then seem reasonable to assume, in cases in which seal impressions are applied in an otherwise inexplicably sophisticated arrangement or in excessive numbers (as in the case of S33/09), that these transmit information of another sort. In this case, too, it is tempting to conclude that such information cannot refer to anything if not to the contents of the recipient, or rather, as we have already suggested, to the nature and quantity of the product it contains, or else to the date the seal was applied. Beyond this, we dare not push further into speculative territory.

The idea that the management of the storehouse in the South-Western Building was not excessively complex, and was entrusted to a small group of functionaries, seems to be supported by the fact that very few of the clay sealings found bear impressions made with different seals. We find the same situation at Shahr-i Qumis and Ulug Depe. The process of applying seals was clearly conducted, for the most part, by a single individual who did not require a counterpart to confirm that the task was done correctly. We may wish to consider pushing our speculations further and – assuming that we are correct to suggest that the seal impressions do not refer to the identity of the functionaries but, rather, communicate some kind of quantitative or qualitative information about the sealed contents – suggest that different seal impressions found on the same sealing might, in fact, transmit different pieces of information about the container's contents. For example, we may wonder whether one type of impression refers to the date, while another to the quantity, or even the very nature of the product in question. There is not a single case in which more than two different seal impressions can be effectively identified on the same sealing. As such, we are led to interpret a combination of different seal impressions, as well as the manner in which they are arranged, as an attempt to articulate, on the surface of the clay sealing, whatever information was required in regard to the contents. In this respect, we need to compare the information provided by the ostraka about the nature, characteristics and the quantity of produce contained in the khums, which was discussed in broad terms earlier. That which the ostraka express in words and figures, the sealings might express through the features of the seal impressions mentioned above.

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<sup>44</sup> Duistermatt 2012, 12–13.





Fig. 19. Likely the point of an unbaked clay sealing, PO7/12

The shape of the seal impressions might just as easily be interpreted as a sort of code for communicating quantitative or qualitative information about the sealed contents: for example, the nature of the produce, the estates it came from, its age, and many other characteristics that will be discussed in depth when a definitive report of the excavations is published. The seal impressions on the clay sealings of the South-Western Building are, for the most part, circular, but there are also many examples of ovals. Square and rectangular impressions appear more sporadically. In a couple of cases, however, we see rough impressions whose shape is more irregular. These may have been made by fingers or some other, unrecognisable object, but they were certainly not produced with a seal. However, it should be stated that these impressions only appear on more or less globular clay sealings that lack the flattened band described earlier.

The only body of evidence we found of an actual seal – not its impression on a sealing – is a thin “button” of unbaked clay bearing an engraved image, possibly a highly stylised face or a symbol of some sort (PO7/12, Fig. 19). Gliding over the question of iconography, which is not within the scope of this paper, this item is still of particular interest from a typological perspective. The fact that such a thin disc of unbaked clay has reached us with its circular surface in one piece suggests that this is indeed the shape it was designed to have, insofar as it is highly unlikely that it broke off like this accidentally. It is most probably the surface of a seal; it is less likely to be a decorative medallion from a piece of pottery or furniture, since it bears an intaglio image rather than an image in relief. As such, it seems more suited to stamping an impression. It might be tempting to think that this “button” would have been affixed to some sort of object that might be

pushed into clay to create such deep impressions, but at this point in time we have no clue to further speculate on the purpose of such a clay object. This is intriguing in itself, insofar as it suggests, once again, that there might have been original sealing practices in use at Nisa that may be of particular interest to us.

Even though we have intentionally avoided the question of iconography, there is one more piece of information we think worth noting. The new inventory of clay sealings does not include a single seal impression that closely resembles any of those found at the Square House. However, even though the iconography is different throughout, certain subject matter does appear in both groups of artefacts, although generally the seal impressions from the Square House appear to be manufactured to a higher standard, at least in some cases. In the collection from the South-Western Building there are no import seal impressions and the intaglio engravings seem overwhelmingly schematic. This is even the case for subjects that are distinctly western in their inspiration,<sup>45</sup> although subjects derived from the local culture, which are unknown in the Greek figurative vocabulary, are in the majority. This group includes the tamga impressions I discussed elsewhere,<sup>46</sup> and other abstract and geometrical impressions that may have local roots or, as suggested earlier, are designed to convey some sort of information, of which we remain ignorant, regarding the contents of a container. The differences between the two collections can certainly be explained by suggesting that the seals belonged to different individual functionaries, although we should bear in mind the doubts already expressed about the possibility that a seal might made exclusive and unequivocal reference to the identity of a particular individual. The possibility that these differences arise from a temporal dislocation seems to be untenable, insofar as the phases of both buildings span the whole life of the citadel. Therefore, they would have been used contemporaneously.

## Conclusions

We will put off any further elaboration of these observations on the inventory of the clay sealings in the final report of the Italian excavations at Nisa (2007–2015). This is to say that what we have offered here are preliminary observations which, all the same, note a number of interesting characteristics and demand further comparison with other, perhaps less well-known but equally important collections, in the interests of developing our understanding of the glyptic arts and administrative practices of the Parthian period. The observations we have assembled here show a distinctive range of sealing practices that are, in large part, different from those found in better-known archives and storehouses. The only comparable collections come from Shahr-i Qumis and Ulug Depe, two sites that, in both a geographical and cultural sense, can be said to be close to Nisa. All the same, we must not forget that inventories of this sort are very rare, and either have only been partially published (such as that from nearby Gobekly<sup>47</sup>), or have not been

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<sup>45</sup> Manassero, forthcoming.

<sup>46</sup> Manassero 2010.

<sup>47</sup> Bader/Gaibov/Koshelenko 1990.

published at all. Furthermore, generally speaking, very little is known about administrative practices in the Central Asian context during this period.

Our observations on the new material evidence from Nisa must therefore be limited in their scope, in anticipation of further confirmation from other inventories and, above all, from the ostraka also found at Nisa, whose commentary would be of particular value, as it would provide an insight into the extent to which the material data matches the epigraphical sources, and as such, deepen our understanding of how the storehouses at Nisa operated.

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