TRIAL TRENCHES AT KOJTEPA, SAMARKAND AREA (SODGIANA). EIGHTH INTERIM REPORT 2018

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The joint Uzbek-Italian archaeological activities of the Institute for Archaeological Research, Uzbekistan, Academy of Sciences (IARUAS) and the Università degli Studi di Napoli “L’Orientale” (UNO) in Samarkand region, was aimed at detecting and investigating possible late Iron age, Achaemenid and post-Achaemenid archaeological horizons. The activities at Kojtepa after the first campaign in May-June of 2008 (Genito, Gricina 2009, 126-128), the second in June-July 2009 (Genito, Gricina 2010), the study activities in September 2010, continued with more ample seasons. The third was conducted in 2011 (June-July) (Abdullaev, Genito 2010-2011; Abdullaev, Genito 2012), the fourth in 2012 (August-September) (Abdullaev, Genito 2013), the fifth in 2013 (August-September) (Genito et alii 2014), the sixth in 2014 (August-September 2014) (Genito, Pardaev 2015), the seventh in 2015 (September-October 2015) through more extensive trial-trenches, and again study activities seasons, in 2016 and 2017.

According to the topographic results achieved by the Italian Archaeological Mission of UNIBO, the city walls, though not still clearly identified, because partially cut through by modern agricultural activities, are very similar to a well-known settlement pattern of an urban system for towns in the ancient Samarkand and Ustrushana areas, in the historical and Hellenistic period.

The joint Uzbek/Italian team spent 5 weeks in the area (from 10th September to 8th October 2018).

Among the others, the activities had the following main objectives, all aiming at working and investigating:

1. new Trenches on the top of the tepe in order to detect as much as possible the network of the walls distributed on the highest part of the tepe: no 25, contiguous to North-West to Trenches nos 23 and 24 and Trenches nos 26, 27, 28, 29, 31, close to Trenches nos 12, 13, 16, 17; 18, 19, Trench no 30, very contiguous to West of Trench no 25, Trench no 32 close to Trench 25, Trench no 33 close to Trench no 24, Trenches no 34 and 35 close to Trench no 30, Trench no 36 close to Trench no 33, Trench no 37, close to Trench no 32; Trench no 38, close to Trench no 36 (Fig. 1);
2. as much as dating material culture possible, in order to obtain a more detailed typological and possibly chronological stratigraphic differentiation;
3. a new topographic campaign with the aim to provide a detailed and exhaustive overview of the results plan of the visible features unearthed.
4. a close-range photogrammetric survey to create an high-resolution ortho-photo and make planimetric drawings.
5. An aerial photogrammetric survey executed with the support of the of the State Committee for Land Resources, Geodesy, Cartography and Cadastre of the Republic of Uzbekistan in Tashkent, concerning the detection with kinematic differential GPS of Kojtepa.

Trench no 12/12 bis

One the most important aim of these operations was to find the precise point in which the two structural mud clay walls SU95 and SU314, identified last years, are connected each other, if any (Fig. 2). From the upper soil (humus) some sporadic pottery fragments come out.

Trench no 12

The collapse of wall SU314 individuated last years and located in the south-western corner and delimitating to the South the same Trench, was started to be removed. The front-face of wall SU95 (135cm wide) is starting to be very clearly seen and the corner with wall SU314 as well.

1 The work has been possible thanks to the renewal of the official agreement between Institute of Archaeology of Academy of Sciences of Uzbekistan (IAASU) and Università degli Studi di Napoli “L’Orientale” (UNO), signed first time in 2008, and 2009, renewed in 2012 in September in Samarkand and in Autumn in Napoli and for the third one in July 2018 in Napoli and in September 2018 in Samarkand.
**Trench no 11/12**

A small cleaning operation is done on the top of wall SU95 and two mud brick greyish-greenish coloured are singled out within a building system of paxa blocks and a good face to West is more clearly individuated.

**Trench no 27**

The Trench no 27 - 4m (South-North)×5 (East-West) - is opened in order to give evidence of the possible continuation of wall SU95, firstly come to the light in Trench no. 11 and never clearly identified in its original size in the more southern Trenches nos 14, 15, 16, 17. Few scattered potsherds are collected. Digging two additional layers are started to be removed SU0 first and SU1 then (Fig. 3). The work of excavation of SU1 starts. The layer is soft and grey in colour. It contains potsherds, included an interesting piece characterized by an engraved decoration. Going down, in the eastern and southern parts of the trench, two portions of walls are put in evidence: the eastern is SU95 (135-140 wide) (oriented North-South), the western (new one) SU501 (97, 98cm wide) (oriented East-West). The two walls are probably connected each other, creating a corner at South-East side between Trench no 27 and Trench no 28 (Fig. 4).

The length of the eastern side of wall SU95 inside the trench is 4.60m, while its western side corresponds to 2.70m. The thickness of walls SU95 and SU501 is about 90cm; the inner structure of this wall is particularly irregular where at mud block you see also mud bricks green coloured.

The area located on the internal side of the wall to North of SU501 is labelled as SU502. It is enclosed by wall SU501 at the southern side and by SU95 on the eastern one. Along the eastern side of wall SU95 is visible a new layer: SU503. Like SU501, it is clayish and soft in the consistence, as well as reddish brown in the colour. It contains several pottery fragments.

**Trench no 28**

The Trench no 28 is opened just West of Trench no 9, 2.50m (East-West)×3.20m (North-South). SU0 and SU1 are removed. The structural remain should be more and more cleared up, and very few materials come from. The wall divides in two parts Trench no 29, to the North with SU517 and to South with SU521.

The complete profile of wall SU514 is clear enough though the northern profile is only partially identifiable, presenting in the middle a breaking semi-circular outline, whilst the southern is very clear, although a little bit narrowing. The width of the wall oscillates between 1.20 in Trench no 28 and 95-98cm in Trench no 29. In any case, the wall seems to run just on the line of wall SU473 of Trench no 25.

**Trench no 30**

New area is opened on the flat space around the location of the total station and the trigonometric point on the top of the tepe, contiguous to Trench no 25, to its South-eastern part, where wall SU473 had appeared. Trench is 5m (East-West) long×3m wide (North-South). The aim of this operation is related to the possibility of discovering the continuation of wall SU473 possibly running to East. Some alignments are appearing along the outline of wall SU473.
The activities are still concentrated on the southern part of the Trench in order to identify and recognize the face of wall SU473 running from West to East in Trench no 25, in an area South of wall SU527. After this operation, the southern face of the wall is more and more evidenced (Fig. 6). Almost in the middle new structural, seemingly, parallel remains (SU352) are evidenced running from South to North connecting with SU473 and irregularly distributed in two or more alignments. The interpretations of these new remains are rather difficult, operating in a more restricted triangular shaped area. The face of the wall although perfectly in line with wall SU514 in Trench no 29, is not clearly visible and then one decides to open a new Trench no 31.

**Trench no 31**

The Trench is located to West of Trench no 27 and to South of Trench no 28; it is 4m long (North-South)×2.20m wide (West-East). The operation has strongly been suggested by the possibility to see how wall SU501, which connects to SU95, is running to West, considering that it was never found in Trenches nos 11 and 5.

The distance between wall SU501 and wall SU514 is constant about 3.67m (Fig. 7). The profile of wall SU501 is quite visible even with some uncertainty in the western part. A new archaeological feature is evidenced constituted by SU551, a cultural level, constituted of a soft clay (a pit) where probably two big jars painted are found.

**Trench no 32**

The Trench is open very close to Trench no 25. The form is very irregularly L-shaped (sub-rectangular) and measures North-South 4.40, West-East (N) 3.00, West-East (S) 3.95.

The excavation is continuously deepening the whole area of Trench and the presence of wall SU473, which is starting to be visible, in the middle allows one to identify two different topographical units SU546 to South, and SU547 to North. On the top some mud bricks and blocks are recognizable and in SU546 a further alignment of greyish greenish colour appears.

Following the line of the greenish colour (mud bricks) identified yesterday, one decides to go down especially in the southern part of Trench in SU546 (the northern part is SU547). The terrain remains very hard and compact, especially to South part (Fig. 8).

**TRENCHES NOS 25, 33, 36, 38 (S. Laurenza)**

The focus points of the fieldwork activities of this year along the southern slope of the tepe have been to better understand the shape and orientation of the large mud bricks dug in the Trench no 24 in the past years (SU464) and to possibly find the external walls of the site. For this reason one has decided to open different Trenches (nos 25, 33, 36 and 38) along the northern limit of the tepe, following the natural slope and also connecting the new trenches with the northern and the southern side of the last opened Trench 24 (Fig. 1).

**Trench no 25**

The activities started opening the trench of 5×3 m, East-West oriented and North-South, connecting the northern with the southern border of Trench no 24. A natural brownish and homogeneous layer of Aeolian origin was immediately found, with more hard and compact texture in the eastern part, and softer in the western (SU1).

Below we found in the southern limit of the trench a wall made probably by a mix of badly preserved mud bricks and *paxa* (SU473) West-East oriented, measuring 1.30m wide×3m long×about 1m high, for the part unearthed. The wall was mostly preserved with an almost rectangular shape presenting an oval cut on its northern side (SU479) running by the eastern to the western limit of the wall (Fig. 9). On the western part of the trench, under wall SU473, we have found some oval shaped layers made by hard and compact clayish soil, most probably constituting the decomposition of the upper part of wall SU 473 fallen down along the natural slope of the tepe (SU481 and SU482).

Immediately beneath wall SU473 and in the space between this wall and the line of mud bricks of Trench no 24 (SU464) there was a sequence of stratigraphic anthropic layers, containing traces of human activities (some big and large pottery fragments, traces of charcoals and little animal bones, some circular cut holes with inside a lot of large sized pottery fragments).

On the southern side of the trench we have found a badly preserved remain of a wall made by 2/3 rows of small sized mud bricks and covering the better preserved lines of the larger mud bricks found at the base of Trench no 24 (SU509). Most probably, following the physical and stratigraphic sequence, this wall could be interpreted as a structure built up after a phase of abandonment of the area, to delimit an open space for people living there for a short
period, placing themselves between the external wall SU474 and the internal wall SU473. It is important to notice that from the potteries’ fragments came out from this area, some probably Kushan period decorated and painted fragments.

So, at the end of the excavation activities in Trench no 25, we understand that we were in presence of a double curtain of walls: the first (SU473) made by paxa and some badly preserved mud bricks running in West-East direction and placed on the upper part of the tepe, most probably the internal wall delimiting the citadel area; the second (SU464) found lower at the base of the Trench no 24, running on the northern slope of the tepe and West-East oriented.

Trench no 33

Then one has decided to open some other trenches along the northern limit of the tepe, following the natural slope of it, and going in West-East direction.

We started opening new Trench 33 on the western side of Trench no 25 and of Trench no 24, in order to check if the mud bricks (40×40×12cm greyish-greenish colored) found at the base of Trench no 24 and also recognized in the upper part of the cleaned western section of Trench no 24, could be part of a largest external wall.

The trench was almost square 3×3m placed on the northern slope of the tepe and following the northern limit of Trench no 24. After the removal of SU0, the natural humus soil, we have dug SU1 made by natural soil with some small pottery fragments, several animal bones and roots. Under it we recognized a different layer made by grayish hard and compact clayish soil with some sandy spots inside of it. It, probably, is the breakup upper part of the paxa of the wall placed on the northern slope, with some natural Aeolian sandy spots inside.

Once removed this layer, we have found below large clay mud bricks of grayish color, well defined and regularly placed on at least 3/4 juxtaposed rows, West-East oriented (SU557). The mud bricks measuring 40×40×12cm and following its orientation and the layout, were similar to the mud bricks SU464 of Trench no 24, found, nevertheless, at a higher level. This probably was due to the extreme slope of the northern part of the tepe, that probably caused a stronger collapse of the wall on this side of Trench no 24. This wall higher than the remaining part of SU464 in Trench no 24 may represent the external wall of the citadel, almost parallel to the inner wall SU473, found in Trench 25, 28, 29, 32, 30, 35, running all along the northern limit of the site from West to East.

Trench no 36

Following the line of the mud bricks, we have opened another Trench on the eastern side just connected to the eastern border of Trench no 33, in order to follow the mud bricks of wall SU557. Once removed the first two natural layers, we have found a clayish layer made of irregular mud bricks of grayish color mixed to paxa of brownish color (SU559). It is placed following the alignment of wall SU557 in Trench no 33, but on a higher level. It was probably the higher part of wall SU557, in a badly state of preservation. Once cleaned this layer (SU559), we notice that the mud bricks and paxa features were placed following the same alignment of lower wall SU557, found in Trench no 33, although the building features in this layer are placed in a chaotic and irregular way, mixed with Aeolian sandy soil and clearly following the slope of the tepe on the northern side. Mud bricks in this trench are clearly made by 4 juxtaposed rows and by at least 3/4 rows of overlapping bricks.

On the south-western limit of trench, we have found some huge pottery fragments, probably crushed pieces of a large jar, going under the South-West section of the trench. So, we cleaned the mud bricks of wall SU557 (40×40×12) which continued on the western direction (Fig. 10).

Trench no 38

We have decided to open the last trench going to the western side of the tepe, in order to see if the wall’s mud bricks will continue. Immediately under the natural soils (SU0 and SU1) we have found a first layer made by the decomposition of the paxa (SU597) with inside some smaller and partially crushed mud bricks. We must note that towards the northern side of the trench above the juxtaposed rows of wall SU557, we have recognized a first row of smaller mud bricks (measuring around 20×20×20cm) laying in a double flat juxtaposed row, with a largest half cut mud brick placed vertically between them as a junction. Below such row of bricks we have found 4 rows of juxtaposed mud bricks of wall SU557. The line of mud bricks of wall SU557 seemed to be interrupted on the south-eastern side of the trench by a yellow/brownish layer, probably made by a decomposed and crushed paxa remains, with no inclusions inside (SU605).
At the end of the fieldworks, we have found the northern external walls of the site (SU557), made by mud bricks of 40×40×12 cm, almost well preserved and West-East oriented (Fig. 11), together with the internal walls made by large blocks of paxa mixed with some mud bricks and placed almost near the top part of the site (SU473).

The excavations made on this northern part of the site let us to understand that the site had most probably a double walled system, with large external walls made by at least 3/4 rows of well squared mud bricks, running all along the northern side of the slope (SU 557) and internal walls surrounding the citadel, made probably by mix system of large paxa blocks and mud bricks (SU473) (Fig. 12).

It is very interesting to note that the space between the two walls (SU473 and SU557) was probably used as a temporary living area, indicating the presence spaces between the two city walls, used or as work crafts area or as temporary encampments area.

TRENCHES NOS 26/16, 16/17, 16 SOUTH (M. Gaudiello)

Trench no 26/16

The trench in an irregular L-shaped and opened alongside wall SU317, excavated three years ago in Trenches nos 13 and 18, aligned North-South (first trait 7.20 m long×80×2.50), in order to understand if other portions of the wall are located to South. The second trait at West, close to Trenches nos 13 (to North) and 16 (to West). At West many pottery fragments come out. In the most southern part of the trench looking for any new rows of wall SU317, three more mud clay grey-greenish fragmented blocks, are identified. They could have belonged to the long row of mud bricks in Trench nos 13 and 18, but are not located in their primary location.

At the beginning, the excavation focused on the northermost part of the trench labelled Trench 26/16, which included the portions of two trenches, previously excavated: Trench no 26 corresponds to the eastern part, sloping toward East, and the “flattish” Trench no 16 to the North-West trait.

The first layer (SU478), put in light immediately below the surface SU1, is a sandy layer with a soft texture, its colour is red-brownish. Herein and mostly concentrated in the trait of Trench no 16, many pottery fragments were found, including an interesting ‘pottery disc’ small animal bones and tooth of sheep. Others two big horizontally located pottery fragments aligned to the floor (SU484, SU485) were discovered alongside wall SU314 and near some blocks of an apparent collapsed mud clay wall structure which became visible. On the North-East side of the trench (ex Trench no 26) there are many small baked clay fragments, a type of plaster connected with a possible wall structure.

Next to the baked clay fragments there are probably fire traces mixed with reddish soil. This SU483, probably a cut into SU478, is constituted by traces of grey ashes and burnt remains on the north-eastern corner and very close to wall SU314. The texture is sandy and compact, the colour is red-brownish. Close to the ashy and blackish spot, three mud clay grey-greenish blocks (SU489a) have been revealed, measured and then removed, in order to compete the excavation of SU478.

SU478 is a very thick layer, especially in the North-East portion, which yielded different kind of remains: pottery fragments, including a terracotta lid, fragmented animal bones, a carapace, several charcoal fragments, interesting baked clay ball of small dimensions, collected in the North-East trait, and millstones as well. A fragmented large vessel with an engraved decoration comes to the light (SU492) (Fig. 13) alongside the western part of Trench no 26/16, were wall SU95 was identified in 2015. Other interesting potsherds yielded from a deepest spit of SU478, in the western part some pottery bases of the so called “Tall-i Barzu-like basis type” are found.

Near the bottom of SU478, the soil is compact, sterile and mostly greyish in colour and new SU were assigned. SU499 represents the West-half portion of Trench no 26/16: it is characterized by hard compact greyish soil, almost regularly, horizontally flat. Three small depressions with their corresponding fillings (SU493 and SU494, SU495 and SU496, SU497 and SU498) cut SU499. A possible very narrow channel-like depression with roughly moves from South, turns on the West and continues to the North, was put in light and excavated. Immediately East, three sub-oval clay bricks were unearthed, of which one is still in situ. SU499 looks like a sort of "plain floor” and measures: North side 2.63 m; West side 2.63 m; South side 1.84; S 1.84 m; South-West section 2.65 m; West-East direction 2.80 m. Herein, Tall-i Barzu-like basis type were collected. On the North, below the section and wall SU314, some potsherds of fine ware and brownish slip come to light, while some bones appear on the South-West edge near and below the western section.
At East of SU499, SU506 is identified, characterized by irregular blocks of mud clay, like *paxa*. It measures South: 0.96m; centre West-East 0.79m; North 1.10m; South-North centre 2.46m. These irregular *paxa* blocks ended and abut on the southern section of the trench two aligned mud bricks, SU507.

Once reached the sterile plain level, the excavation in Trench 26/16 stopped and the activities started at the South of the excavated trait of Trench 16.

**Trench no 16/17 and no 16S (South)**

At the end of excavation of Trench no 26/16 we decided to re-open the southern part of Trench no 16, and Trench no 17 excavated in 2014 and 2015. The measures of the trench are: northern side, 3.40m; eastern side, 7.50m; southern side, 3.30m; western side, 6.90m.

Immediately below SU1, a first layer of a soft brownish soil, result of slightly backfilling of previous excavation and wind deposits, come out: SU511. This layer is characterised by scattered bones, potsherds and a fragment of a red brick, the North-East corner by concrete wasps’ nests, while the southernmost part of the trench (ex Trench no 17) several bones were collected in and around a brownish spot.

SU512 is the arbitrary layer, noted immediately below SU511. It covers almost the whole area and is characterized by compact greyish soil. The layer yielded a few pottery slags, one disk base fragment with a piece of a possible spout, stones and possible pounder stone (or millstones?). Some reddish-brown spots and hard compact ashy spots, with few charcoal pieces and fragmentary bones are found in the North-East part of the trench. While, near the centre of the trench, at its southern side, an irregular sub-rounded feature characterized by soft reddish-brown soil was highlighted and completely excavated (SU513). Mixed with the soft brownish soil, where collected several animal bones, small bones (bird?), charcoal samples, ashy soil with burned plant, used maybe as fuel. SU513 is completely removed and it appear as a “kitchen waste” area: some ashy soil, animal bones but any evidence of burned marks, teeth, burned bones or firing place. Once excavated SU513, two large destroyed *paxa* blocks are put to the light, SU538, which seems the lower continuation or a possible basement of SU515 in itself (see below).

In the central part of the Trench, North to SU513, some red baked bricks (18×19cm) come to the light. Those are part of a complex structure, SU515, characterised by few red bricks and rectangular mud blocks (diferent dimensions, mostly roughly 30×40cm). The whole exposed structure is characterised by five parallel rows of squared mud bricks, sometimes comprehending small bricks amongst them. The measurements of the whole structure are: c. 150m North; c. 2.60m East; c. 1.80m South, c. 2.80m West (Fig. 14). All the main rows of bricks seem running East-West, while one alignment of sub-rectangular elongated bricks runs with South-North direction (SU535), and seems to abut SU515 to the West. The soil removed to the West of SU535, is greyish, hard, compact and mixed with small stones, gravel and a few charcoals. North to SU535 and between SU515 and the West section, a small spot of compact greyish soil, mixed mainly with charcoal has been identified and named SU543. This layer is characterised by hard, compact and greyish soil on the upper part and brownish, soft soil layer with ceramic fragments immediately below the first soil spit. A fragment of cooking pot rim with burned external surface is collected. After the complete removal of SU543, the unexcavated underneath bottom was “artificial” created and labelled as SU545.

Located South to SU515 and East of SU513, has been identified a hard, compact, greyish and almost flat layer, SU518, located therefore on the West part of the trench, in its southern side.

On the opposite site of the trench, SU519 appeared as a hard, compact and greyish layer with several visible potsherds inside it, fragments of pottery slags, a few baked bricks fragments, several bones small stone chippings. It is placed directly at North of SU515, it is covered by SU512. SU519 was completely removed until to reach the same layer of the underneath SU520. During the removal of SU519 on the western side a cut has been identified (SU522) between the second and third row of block of SU515. Its filling, SU523, is characterised by brownish soft soil, mixed with several animal bones, fragments of carapace and turtle’s nails.

During the removal of SU519 a new SU520 has been identified. This quite sterile layer, characterised by brownish grey medium soft soil, yielded a few potsherds and fragments of pottery slags. Almost in the centre of this layer a fragment of grinding stone and millstone are collected, as well as rare bones. The eastern part, instead, is very hard and characterised by wasps’ nest and a greyish hard
soil and potsherds. Just below the hard, greyish soil, in proximity of the southern SU518, was found and removed a very thin soft brownish grey soil mixed with straw. The layer became softer and several charcoal samples were herein collected, in addition with a strange organic remain (animal dung or root?). In the northernmost part, the layer is always quite soft, brownish/greyish and characterised by several small stones and sandy soil. This characterisation makes possible the comparison and association of SU520 with northern SU478 in Trench no 26/16. Finally, SU520 was excavated in the northern part of the Trench no 16/17 until to reach, more or less, the same level of the sterile layer SU499 in Trench no 26/16. The removed soil yielded few potsherds and a few animal bones. As well as in Trench no 26/16, SU499 is compact and almost flat. Moreover, some paxa “irregular floor” of SU506-507 in Trench no 26/16 were herein put in light, with an orientation South-East. Noteworthy, two mendable fragments of bronze foil with a small passing hole are collected in association with few potsherds, in the central part of SU499. The scratching operation in SU499, reveals a quite hard, greyish brown soil mixed with scattered potsherds. Just North of SU515, SU519 is cut by 10 small depressions (SU 562, 564, 566, 568, 570, 572, 574, 576, 578 and 580), filled by sterile soft greyish soils (SU563, 565, 567, 569, 571, 573, 575, 577, 579 and 581). The removal of SU519 and SU520 on the West side of Trench no 16/17 and immediately North of SU515, revealed some mud bricks visible in the West section, two bricks lay on the top of SU520 (SU550) and other two overlapped blocks/bricks (?), labelled SU531, located in the North-West corner of Trench no 16. SU550 could be the remains of a collapse of one of those structures, probably SU531. Part of the two overlapped rows of mud and baked bricks/blocks are covered by the limit of the trench. The whole excavated structure has a rectangular shape plus a sort of eastern projection. The measurements of this structure are for the uppermost mud brick: 20cm South×c.18cm. East; the lower block is 30cm South×c. 12cm. East; the adjacent main biggest paxa block 34cm South, 50cm East and 60cm North; the eastern projection of this big block is c.15cm South×20cm East (Fig. 15). During the digging of SU520, in proximity of SU518, a cut in SU520 was partially identified. The eastern limit of this hypothetical cut, labelled SU539, runs below the eastern section of the trench. The filling SU540 is characterized by soft brownish soil mixed with charcoal samples, bones and a few fragments of baked brick.

In the extreme South-West corner of the trench, a feature characterised by three overlapped depressions, called SU536 and filled by SU537 has been identified. Once removed the filling of soft brownish soil mixed with the harder greyish soil of the uppermost SU512, animal bones, some burned bones, one small animal nail and rare potsherds, the SU536 seems to be part of a squared brick with a central depression while the southern part is still below the southern section.

Afterwards, we decide to divide the trench and excavate only the northern part of Trench no 16/17, which corresponds to the southern trait of Trench no 16, and therefore it has been called Trench no 16S (South). The limits of Trench no 16S are the following: northern side, c. 3m; eastern side, c. 2.20m; southern side, c. 3.05m; western side, c. 2.60m.

In the northern part of the trench several breaks and fractures in SU520 were put to the light, SU548 and its filling SU549, characterised by soft brown soil, almost sterile, which yielded just one fragment of animal bones, one potsherds and red brick fragments, was completely excavated.

A pit, SU553, cutting SU520 just East of SU515, and two blocks modelled in sub-circular shape, SU560, were put to the light. The pit/feature SU553 was first of all cleaned out along a half portion, and once highlighted the overlapped different type of fillings and looking for the edges of the cut itself, it was completely excavated. The filling of SU553 is characterised by SU558, an intermediate layer of soft blackish soil where we collected charcoal and soil samples; an underneath soft layer of brownish sandy soil, called SU582 (Fig. 16), which yields some fragments of pottery, one backed clay fragment and just a few animal bones. Finally covering the bottom of the pit, a last layer of brownish greyish coloured and soft soil (SU554) was removed. Therein and attached to the deepest borders of SU553, perfectly low cylindrical clay looms where collected. We collected in total almost 6 complete clay looms (10cm in diameter and c. 4cm in thickness) and several fragments (Fig. 17). The complete shape of the pit is roughly circular. The maximum width is c. 70cm East-West and is deep about 30cm.

Pit SU560 is limited in the upper and eastern part from two blocks cutting in circular shapes and immediately adjacent to SU515. The opening of the two bricks is about 60cm in diameter and about
35cm deep from the bricks surface. The central part of SU560 is c. 30cm in diameter. The filling, SU561, is characterised by soft, brownish, sandy soil (Fig. 18).

THE TOPOGRAPHIC AND PHOTOGRAMMETRIC SURVEY (R. Valentini)

In the 2018 a new topographic campaign has been performed by R. Valentini with collaboration by Siroj Mirzhaummedov with the aim to provide a detailed and exhaustive overview of the results plan of the visible features unearthed.

Besides the topographic work was carried out a photogrammetric survey.

a) Topographic Survey

The topographic campaign of the archaeological area of Kojtepa started since 2007 (Genito et alii 2009). During 2018 campaign we have not been able to find on field the previous topographic network points. Probably all pegs have been removed during the years.

A new simple topographic network with only 4 pegs (A, B, C, D) has been fixed in area around the tepe where it was possible to observe each trench of the excavation area (Fig. 19) to give support to archaeological activity by setting the cardinal points of the trenches excavated, by a daily outlining of the quoted points and by drawing and sketching the excavated level. Afterwards, these pegs were georeferenced and a monograph for each one was created (Fig. 20).

Due to total station used (Trimble Elta R55) it wasn’t possible to made a closed traverse, but we hope in the future to have the opportunity to use the same points with a newer total station to make a closed traverse.

A closed traverse begins and ends on the same point and so the angles can be closed and the closure accuracy can be determined mathematically. The difference between the measured position of the closing station after completing the loop and its “actual” coordinate value, represents the misclosure.

It is the difference that is distributed around the network to give “adjusted” coordinates.

As we have not been able to set up a closed traverse, as write above, point D has been oriented and quoted to an existent trigonometric point on top of tepe. All 2018 quoted points refer to this trigonometric measurement.

From point D we have been able to point to all trenches excavated in the past years and therefore to the new one. The results of the processed data show the whole excavated area on the single dwg file (Fig. 21).

b) Close-range Photogrammetry

Due to the my limited time to work in the field, the traditional survey has been supplemented, in some cases, by close-range photogrammetry approach used to acquire and render with accuracy and speed acquisition some specific parts of the site according to a well-known workflow. The data-acquisition was carried out by a FX camera Nikon 750D SLR focal length 18mm, sensor 24,3Mpx.

Since one of the targets of the 2018 campaign was the identification and analysis of the architectural elements, the 3D digital twin of the new excavated trenches has been created to easily inspect, describe and draw all the features also in the laboratory in Italy.

For each trench has been created an high-resolution ortophoto to make planimetric drawings of each stratigraphic unit (Fig. 22).

As the weather is always sunny at the archaeological site of Kojtepa, the shots had to be generally scheduled in the early in the morning between 7.30 and 9.00, when the sun is high enough and, consequently, the shadows of the walls and other architectural elements are less troublesome. Analogously the data-acquisition of the strips had to be planned to avoid the shadows of the surveyors on the features to be acquired.

c) Aerial Photogrammetry

Few days before we started the field work (07.09.2018), a photogrammetric survey by UAV has been undertaken by State Committee for Land Resources, Geodesy, Cartography and Cadastre of the Republic of Uzbekistan in Tashkent.

The survey undertaken with a flight at ca. 50m high, covered an area of 0.143km².

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2 In archaeological missions abroad, frequently, topographical grids need to be checked before starting a new survey, mainly when archaeologists work in a particular area. Usually the pegs of the grid come removed during the absence of mission, therefore they were never used.

3 GPS survey executed with the support of the State Committee for Land Resources, Geodesy, Cartography and Cadastre of the Republic of Uzbekistan in Tashkent.

4 The height read for point D is -0.961m.

5 Infra p.166, n. 7.
A dataset with 305 images with a resolution 5472×3648 has been calibrated with the software Pix4D, Average Ground Sampling Distance (GSD) results is 1.90cm, that mean a portion of the image correspond 1.90cm of the real6.

From processed data have been generated contour lines at 0.50m (Fig. 23) and a DEM (Digital Elevation Model) to outline the height and the morphological characteristics of the tell (Fig. 24).

Finally all data have been processed in laboratory and merged in a single map (Fig. 25) that form a special overview of area with the outlines of the northern and southern profiles.

In conclusion, the data provided good results in terms of accuracy that can be estimated within a range of 2-3cm. If one considers the nature of features present at Kojtepa, the measured distance appears compatible with a general 1:200 scale map.

We hope that in the feature all this data will form the base for a GIS.

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6 Infra p. 166, n. 9.
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Fig. 1 - Kojtepa, General Map of the Trenches in 2018
Fig. 2 - Trenches nos 12/12bis, the angle between wall SU95 and wall SU314.

Fig. 3 - Trench no 27, before the excavation.
Fig. 4 - Trench no 27, three new SU, 502 to North, 503 to East, and 504 to South

Fig. 5 - Trench no 28, wall SU514 which does not connect with SU95
Fig. 6 - Trench no 30, the prolongation of wall SU473 coming from Trench no 25

Fig. 7 - Trench no 31, SU501 and wall SU514
Fig. 8 - Trench no 32, the coming up of the continuation of wall SU473

Fig. 9 - Trench no 25, SU482, 490, along wall SU473 1.30m wide
Fig. 10 - Trench no 33 (to background) and Trench no 36 below SU557

Fig. 11 - 3D orthophoto of wall SU557 in Trenches nos 24, 33, 36 and 38
Fig. 12 - Map of the excavated area with wall SU473 and wall SU55
Fig. 13 - Trench no 26/16, SU492, with a fragmented large vessel with an engraved decoration come to the light on SU478, as seen from South-West.

Fig. 14 - Trench no 16/17. SU515, 520, 539, 540 as seen as from West.
Fig. 15 - Trench no 16-S. SU531, as seen from East
Fig. 16 - Trench no 16/17, SU553; middle size pit partially excavated with circular clay weights and the filling SU582, from North

Fig. 17 - Trench no 16/17, SU553, two clay weights in *situ* on the filling SU582 in the southern part of the pit
Fig. 18 - Trench no 16/17, SU560, 561, as seen from East

Fig. 19 - The new topographic network with only 4 pegs (A,B,C,D)
Fig. 20 - The 4 pegs’ monography
Fig. 21 - The drawing of the whole excavated area (2018)
Fig. 22 - An example of the high-resolution ortophoto

Fig. 23 - the contour lines at 0,50m
Fig. 24 - The Digital Elevation Model of the area
Fig. 25 - Lines contour and outline of northern and southern profiles