The Khinis-Bavian reliefs

Introduction

The Khinis monumental complex, like that of Maltai, is associated with the great water-management network built by Sennacherib. It is located on a rock face on the right-hand side of the River Gomel, at the beginning of the canal dug by the Assyrian sovereign to redirect the river and use it to irrigate the land around Nineveh and take water to his capital city.

Fig. 38. View of Khinis showing positions of the monuments. Nos. 12 and 1 –11: niches. RR: Horseman Relief. LG: Great Relief. SM: Monolith. (photo A. Savioli)

Rediscovery of the reliefs

F. M. Fales, in “Khinis/Bavian: changing models for an Assyrian monumental complex”1 narrates the history of the rediscovery and study of the reliefs over the last two centuries.

The first complete description of the site was given by Austin Henry Layard, who visited it in 1853 and stated that it had been discovered by Simon Rouet, French consul in Mosul. The site was

1 Fales 2017, 237-274.
visited in 1898 by Eduard Sachau, a German orientalist, and later by Leonard King (1904), who – ten years later, in a letter dated February 1914, quoted in its entirety by Bachmann – sent all his notes to his German colleague Eduard Meyer. The Khinis site was also visited and studied by Bell (1909), the Wilgram brothers – who in 1914 published “The Cradle of Mankind; Life in Eastern Kurdistan”, Bachmann in 1914, Jacobsen and Lloyd in 1934, and David Oates in 1953.

It is most useful to compare the photographs furnished by King, Bell, Bachmann, and Jacobsen and Lloyd with the current state of the reliefs.

**Description of the reliefs**

**The niches**

Immediately after the quarry, to the south, there are twelve niches carved into the cliff face. They are numbered from 1 to 11 from south to north, i.e. starting from the site’s entrance according to King's numbering, as reported by Bachmann. The niches were probably carved from 11 to 1, following the expansion of the quarry. In 2012, a new niche was added to the group, situated however further south than no. 1. The existence of this niche, number 12, was discovered by Prof. Daniele Morandi Bonacossi while working on the LoNAP project (Land of Nineveh Archaeological Project).

The only niches that can be observed at close range are nos. 12 and 1-5, since the others are not accessible due to their position on the higher part of the cliff. Therefore, in this project we propose the conservation treatment of the first six niches (niche 12 and niches 1-5), but we also describe the state of preservation of niches 6-11 assessed from photographs taken by Alberto Savioli with a DJI Phantom 4 Pro drone.

In the niches the sovereign Sennacherib is represented facing right in an attitude of veneration together with the gods’ astral symbols, positioned above, to the right of the king.

Niches 4, 7 and 11 contain the so-called Bavian inscription that celebrates the canal’s construction and the sovereign's achievements in battle.
The Great Relief

The Great Relief is a large sculpted panel measuring circa 9 x 9 m. It portrays four standing figures, each about 6.5 m tall. On the left, facing to the right, is the sovereign Sennacherib, his right hand near his nose in the typical gesture of veneration and reverence for the god. His left hand holds a hammer, one of his royal attributes. To the right of Sennacherib, in a central position, there are two deities facing each other. On the left is Assur standing on a mushkushshu and a horned lion, his sacred animals. In his left hand he holds a ring and a rod, measuring tools and attributes of the constructor king, symbols of his royalty.

Facing Assur is his accompanying god Mullissu, standing on a lion with a palmette, symbol of fertility, in his left hand and his right hand raised. On the right of the relief, the series closes with a figure of the sovereign looking to the left.

On the upper part of the relief, which may be reached from the rocky plateau housing niches 4 and 5, there are the remains of two pairs of lions, together with postholes and a drainage channel, which Reade interprets as the remains of a pavilion held up by columns.

Fig. 39. Great Relief (photo A. Savioli)

8 For the various interpretations of the meaning of the rod and ring, see the study of M. Abram 2011. “A New Look at the Mesopotamian Rod and Ring: Emblems of Times and Eternity”.

9 Reade-Anderson 2013, 97.
The Horseman Relief

On the same rock face, south of the Great Relief, there is the Horseman Relief, a sculpted panel measuring 6.7 x 4.2 m.

On two side podiums – or more probably what was once a step that ran along the base of the relief (and thus higher than the base itself) – there are traces of the representation of two Assyrian kings. Of the right figure remain a foot and a heel, as well as traces of clothing. A drawing by Bachmann shows traces of the back of the garment and the heel of a left-hand figure that is no longer present. On the upper left, two deities were shown on their sacred animals, probably part of a procession similar to that seen on the Maltai panels. Nothing now remains of these two sculpted
figures due to collapse of the rock, but they are clearly visible in Bachmann's 1914 photographs. In the central part of the relief, a rider is carved on a horse with raised front legs. Of this relief the rider's head and bust survive, as well as part of the head, neck and right front foot of the horse. The lower part of a back foot, a hoof and the tail are also preserved. In at least two points of the relief a spear is also visible. Several hypotheses have been put forward concerning the execution of this relief; these are summarized in “Gunduk, Khanes, Gaugamela, Gali Zardak – notes on Navkur and nearby rock cut sculptures in Kurdistan”. The most interesting, proposed by Reade, suggests the presence of an Assyrian relief with a procession of deities in the upper part of the panel, two figures of the sovereign at the ends and a large celebratory inscription in the centre. After Alexander the Great's victory at Gaugamela (probably modern Tell Gomel) in 331 BC, the inscription was substituted by the figure of a man on horseback (perhaps Alexander himself) to celebrate his victory over Darius III. In Parthian times the horseman was modified to give it a Parthian appearance.

Fig. 41. Horseman Relief (photo A. Savioli)

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11 Bachmann 1927, 20 Fig. 14 and pl 19–20.
12 Reade-Anderson 2013, 97–118.
The Monolith

This monumental carved stone monolith was placed at the head of the canal built by Sennacherib. In an unspecified period, this gigantic monument slipped, resting partially on its side; it broke in two pieces and was partly covered by the water of the River Gomel. Carved on the main, northern, side are three figures seen face on: the king, shown twice on either side of a pedestal, and the larger god Assur at the centre standing on animals, as may be seen in the photographs of Jacobsen and Lloyd. On the left corner there was a lamassu (a winged deity, protector of gates), and probably another on the right corner. The left-hand lamassu, of which there are traces of a wing on the monolith's east side, disappeared several decades ago. Together with the lamassu, the king's pedestal on the north side was also destroyed. It is possible that the lamassu was removed for sale on the clandestine antiquities market, but the rock may simply have broken, sending it down to the riverbed.

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13 Jacobsen-Lloyd 1935, pl. XXXIV/B.
14 In the pictures taken in the mid-1930s by Jacobsen and Lloyd the lamassu is still present (Jacobsen-Lloyd 1935, pl. XXXIV).
On the east side of the monolith there is an upper register with the ruler placed centrally, looking leftwards towards Assur, who stands on his two sacred animals. In his left hand the deity holds a ring and staff, traditional symbols of power. Of the figure of Mullissu, represented to the right of the king and now lost, remains part of the paw of the lion on which the deity stood in the left-hand piece of the monolith, and part of its two hind paws on the right-hand fragment. In the lower register, above the pedestal, on the far left there is the wing of the corner lamassu and a figure that probably represents a hero. On the right-hand piece of the monolith there is a trace of the wing of the lost lamassu, which is recorded in the photographs of King, Bell, Bachmann and Jacobsen and Lloyd.

Fig. 43. North side of the Monolith
Fig. 44. The Monolith from above (photo A. Savioli)
**The Fountain with two rampant lions**

The fountain consists of a square tank accompanied by an ornate fountain with two rampant lions and a large central mask representing the head of a roaring lion from whose jaws water once gushed. The two lions, already heavily deteriorated in the 1935 photographs, are barely visible today.
Fig. 47. Lion Fountain

Fig. 48. Lion Fountain, detail
Sample collection and results of analyses

As for the Maltai site, a number of samples were also taken at Khinis in order to perform analyses that will allow targeted conservation treatment, following the criterion of minimum intervention.

The samples were analysed in the Laboratorio di Analisi dei Materiali Antichi – LAMA, directed by Prof. Fabrizio Antonelli (IUAV University, Venice), with consultancy by Prof. Lorenzo Lazzarini.

The results are summarized below.

Mineralogical/petrographic and physical description

Microscopic examination of a thin section of sample #KHINNIS16_9 showed that it consists of a microsparitic calcareous rock with high porosity, classifiable as a mudstone.

Subsequently, after carbonate determination in samples #KHINNIS16_9 e #KHINNIS16_6 the insoluble residue obtained was used to determine the clay fraction (particle size ≤ 4 μm). This was composed of phyllosilicates (clinochlore and swelling chlorite), and especially clay minerals (montmorillonite, palygorskite, illite and kaolinite) which, due to their structural characteristics, are able to absorb significant quantities of water and for this reason undergo repeated cycles of absorption-desiccation inside the stone.

Mercury porosimetry was used to quantify the amount of open pores, which is the cause of damage due to the crystallization of salts since it determines the circulation of liquids.

Sample #KHINNIS 16_9_3 had a high "Total Open Porosity" – from minimum 19.44% to maximum 20.92% – made up pores with an “average diameter” of c. 0.14 μm. Rocks with these porosity percentages are classified as "very porous" to "extremely porous".

As at Maltai, pores with diameters of less than 1 micron constitute the majority, with negative consequences due to the crystallization of water (frost weathering) and salts (salt weathering).

Mineralogical, chemical and biological analyses of deterioration and products produced by biological deterioration present on samples

List of samples analyzed with sample location:

15 Antonelli 2017.
16 F. Antonelli 2018.
Fig. 50. Niche 12 samples

Niche 12

#K_N1-C1: organic deposit and substrate

Fig. 51. Niche 3 samples

Niche 3

#K_N3-C1: movable fragments
Fig. 52. Niche 4 samples

Niche 4

#K_N4-C11: detached fragments with biological colonization and white deposit
#K_N4-C12: biological colonization

Fig. 53. Horseman samples

Horseman

#CAV_C3: fragments with white deposit
#CAV_C4: fragments with biological colonization
#CAV_C9: fragments with biological colonization and white deposit
Analyses conducted by LAMA on the biological colonies showed the presence of moss, cyanobacteria and various types of lichen (foliose, crustose and fruticose).

The percentage of soluble salts is low although not negligible, varying from 0.18% (sample #CAV_C9) to 2.06% (sample #K_N3-C1). These are mostly sulphates, with much smaller amounts (sometimes only traces) of chlorides and nitrates.

**Preservation state**

Determination of the state of preservation was carried out by means of a close visual analysis where the relief’s height above the ground made this possible. Where the reliefs could not be reached, a pair of binoculars and high-resolution photographic images were used. Hypotheses will therefore be subject to verification after scaffolding has been erected, with possible modifications as work proceeds.

For description of forms of alteration and deterioration, see: AA.VV. “Beni culturali – Materiali lapidei naturali ed artificiali. Descrizione della forma di alterazione – Termini e definizioni [Cultural Heritage - Natural and artificial stone materials. Description of forms of alteration - Terms and definitions]. UNI 11182/2006".

**General considerations**

The various types of deterioration found on the Maltai reliefs are also present at Khinis, where however there are fewer areas with alveolization, and the cavities are smaller. At Khinis instead there are marked differences in deterioration, depending on the characteristics of the rock and atmospheric phenomena. This takes the form of horizontal grooves (Fig. 54) and the presence of harder nodules visible on surfaces after less resistant components have been removed by erosion. Although the place is very popular and a destination for trips, degradation caused by human activity is slightly lower than at Maltai, due to the presence of a guardian and the height of the reliefs above the ground. In the past, holes have been dug into the surface of the reliefs to search for hidden treasure in the rock, in accordance with a belief that was widespread in the populations of northern Iraq and eastern Turkey (niche 4), as well as rock-cut tombs (2nd-4th century AD), while the sculpted surface was frequently used as a target for shooting or throwing stones etc. (Fig. 55).
Fig. 54. Differential deterioration on the Great Relief

Fig. 55. Bullet marks (Niche 4)
Niche 12

Dimensions: 1.5 x 2 m

Of niche 12 part of the frame remains, but none of the relief has been preserved. Little or nothing of the original surface seems to have survived; some traces are perhaps visible on the right side of the niche.

The entire rock surface is in an advanced state of deterioration, with deep flaking, and the upper and left sides of the frame are missing. The lower part of the niche is affected by a massive biological colonization, which in some parts forms crusts up to several millimetres thick. Part of the lower portion is undergoing conversion to travertine, and there is abundant plant growth due to the constant presence of water.

Fig. 56. Niche 12
Niche 1

Dimensions: c. 1.5 x 1.4 m

The high and low parts of the niche have been lost due to rockfalls. The left hand and arm, and part of the right arm of the sculpted deity survive, as well as astral symbols on the upper right. The remaining surface is characterized by pale drip-marks, carbonate incrustations and biological attack. There are also the usual cavities in the rock due to the karst phenomena characteristic of the whole area, and obvious flaking in the lower part, where some rock has been lost. The rock into which the upper part of the niche was carved is composed of many thin diagonal layers, and is fragile and prone to disintegration. Earthy deposits around the niche have allowed the growth of grass and small shrubs.
Fig. 58. Niche 1

Fig. 59. Niche 1 – drawing
Niche 2

Dimensions: 1.6 x 2.2 m

Niche 2 is located high above the road, just below the modern fence that runs along the entire upper part of the cliff. Compared to Bachmann’s photographs, the sovereign’s face and his right hand are now missing. The niche is affected by carbonate incrustations and biological colonization and in some places plant growth has caused splintering of the rock. On the right of the relief small karst cavities are present, which however do not affect the sculpted part. A large crack runs across the upper part of the relief, together with other smaller cracks.

Fig. 60. Niche 2 (photo A. Savioli)
Fig. 61. Niche 2 – drawing

**Niche 3**

Dimensions: c. 2.9 x 2 m

Niche 3 is actually an unfinished carved panel. It is rectangular in shape, with a badly damaged frame. Measures need to be taken to ensure the safety of the upper frame and the part of the relief with the astral symbols, beneath which runs a large crack. On the surface there are inscribed and painted graffiti underneath the lower frame.

In the left-central portion of the panel part of a sculpted sovereign figure may be seen. The feet resting on a flat surface and the left hand holding a hammer remain. Just a trace of the rest of the figure survives.

It is believed that this panel may not have been finished because the surface on which the figure stands does not continue up to the frame on the right.

The panel has lost of stone fragments and flakes, especially in the lower part. Biological colonization is light but widespread.
Fig. 62. Niche 3

Fig. 63. Niche 3 – drawing
Niche 4

Dimensions: 2.32 x 2.81 m

Niche 4 belongs to the groups of three niches with inscriptions (4, 7, 11).

In the central part of the niche a figure of the sovereign was sculpted, of which the lower part of the garment remains with his feet. Nothing else is left of the figure except for its outline. On either side of the figure there is a cuneiform inscription, the conditions of which – due to loss of material – appear worse than in Bachmann's photographic documentation. This is due both to natural deterioration and to acts of vandalism. In the central part a hole has been dug and bullet marks can be seen.

Flaking is present over entire surface of the niche and there is deterioration caused biological colonization in the niche intrados and on the outside.

The presence of the cuneiform inscription makes conservation operations even more delicate. The detachment of even a tiny sliver of rock might prejudice the reading of the cuneiform signs.

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Fig. 64. Niche 4
Fig. 65. Niche 4, detail of inscription

Fig. 66. Niche 4 – drawing
Niche 5

Dimensions: 1.77 x 2.45 m

In the fifth niche only the outline of the figure and its feet standing on a shelf remain. Little may be understood of these. A horizontal crack runs across the upper part of the niche. There is localized flaking and the entire surface is subject to biological colonization and carbonate concretions.

Part of the upper frame is missing and needs to be rebuilt.
Niche 5
Dimensions: 1.5 x 2.2 m
Preservation state assessed from photographs.
On the right-hand exterior of the frame there is a large rock fragment that needs to be fixed, and in the lower part, other smaller pieces also require anchorage. A small portion of the frame should be rebuilt in the vertical part at the top left. The surface exhibits deterioration due to flaking. Salts and white drip-marks may be seen in the upper part under the frame. There is vegetation at the base of the niche.

Niche 6
Dimensions: 1.5 x 2.2 m
Preservation state assessed from photographs.
On the right-hand exterior of the frame there is a large rock fragment that needs to be fixed, and in the lower part, other smaller pieces also require anchorage. A small portion of the frame should be rebuilt in the vertical part at the top left. The surface exhibits deterioration due to flaking. Salts and white drip-marks may be seen in the upper part under the frame. There is vegetation at the base of the niche.
Fig. 69. Niche 6

Fig. 70. Niche 6 – drawing
Niche 7

Dimensions: 1.98 x 2.31 m

Preservation state assessed from photographs.

Niche 7 is crossed horizontally by a deep fissure, along the sides of which the relief requires consolidation, anchorage and plastering. Some parts of the frame need to be fixed and its missing parts should be rebuilt to protect the relief from rainwater runoff. There is plant growth and biological colonization. Flaking is mainly located on the figure of the sovereign and in the upper right half of the niche.

Fig. 71. Niche 7 (photo A. Savioli)
Fig. 72. Niche 7 – drawing

**Niche 8**

Dimensions: 1.73 x 2.15 m

Preservation state assessed from photographs.

Comparison with Bachmann's photograph\(^1\) reveals that a considerable amount of the carved surface has been lost in the interim. The hammer's head and all the lower part of the figure of Sennacherib down to (but excluding) the feet are no longer present.

There are some signs attributable to gunshots, such as the large hole in the centre of where the garment once was, which may have been caused by a large calibre projectile.

In the upper part of the niche there are carbonate incrustations, and flaking is spread over the entire surface. The exterior and some parts of the niche intrados are covered by biological colonies. Some parts of the frame need to be anchored and other absent parts need to be rebuilt.

\(^{19}\) Bachmann 1927, pl. 21.
Fig. 73. Niche 8 (photo A. Savioli)

Tav. 74. Niche 8 – drawing
Niche 9
Dimensions: 1.4 x 2.06 m
Preservation state assessed from photographs.

The frame of the niche requires anchoring in some places, and some small parts need to be rebuilt. Numerous bullet impacts are visible. There is partial alveolization and flaking that affects the whole surface. The upper part of the niche appears to have been damaged by biological colonization, carbonate incrustations and the crystallization of salts.

Fig. 75. Niche 9 (photo A. Savioli)
Fig. 76. Niche 9 – drawing

**Niche 10**

Dimensions: 1.62 x 2.11 m

Preservation state assessed from photographs.

A few parts of the frame and the external part of the niche probably require anchoring. The reconstruction of some parts on the right-hand side should also be considered.

The surface of this niche is strongly eroded, a phenomenon not seen in the others. This might be due to the fact that the niche seems to have been cut from further into the cliff, and is perhaps made from a layer of rock more susceptible to atmospheric agents such as rain and wind. In the central part of the relief there are widespread microkarst cavities.

The niche suffers from deterioration due to flaking, but the extent is difficult to judge from photographs. The upper part of the niche under the frame shows biological deterioration and carbonate incrustations.
Fig. 77. Niche a 10 (photo A. Savioli)

Fig. 78. Niche 10 – drawing
Niche 11

Dimensions: 2.25 x 2.48 m

Preservation state assessed from photographs.

Like the previous one, this niche is also in a poor state of preservation that is difficult to evaluate from photographs. The surface, especially that of the sovereign figure, is particularly rough, perhaps covered with thick incrustations. Large amounts of stone have been lost from the upper part. Unquantifiable flaking is present. Parts of the frame are missing and require reconstruction.

Fig. 79. Niche 11 (photo A. Savioli)
The Great Relief

The relief was damaged by the construction of four tombs in the Early Christian era; only the second figure from the left, that of Assur, was left untouched.

The relief exhibits strong differential deterioration, with large horizontal bands that follow the layering of the rock.

Widespread degradation has contributed to considerable loss of the sculpted surface. Some columns of the triple entrances to the two largest tombs have been lost; unsupported arches may need to be made secure. There is also a marked biological colonization and plant growth in the fissures between rock strata and at the base of the relief. Some points inside the panel, on the frame and outside it need to be anchored because of the risk of falling. Besides their importance as components of the relief, they also constitute potential risks for visitors.

Some parts of the frame, such as the upper left corner and the portion between the two groups of lions, need to be rebuilt so as to restore the frame's protective function against rainwater.
The Horseman Relief

The relief is in an advanced state of deterioration. It has undergone marked differential erosion, characterized by numerous deep horizontal grooves and the appearance of "nodules" that are components of the rock itself, and a considerable loss of sculpted material. On the right and left of the horseman, rock-cut tombs were dug in the 2nd - 4th century AD.

Sizeable rock falls have occurred from within the panel. A small relief depicting a procession of deities standing on their respective sacred animals that was present on the upper part collapsed during the second half of the 20th century along with a considerable volume of stone. Other parts which are essential for understanding the relief – such as the horse's neck and the rider's body – are seriously deteriorated and at great risk of falling.

A large bush has taken root in the crack that runs through the upper part of the relief and needs to be removed. In several places outside the frame there is also plant growth that should be eliminated.

Biological colonies are present above all on the left-hand and upper parts, with traces also in the central portion.

The entire surface is threatened by flaking and exfoliation.

The Monolith

This extraordinary monument is surrounded by water and vegetation, making it difficult to study closely. The relief on the north face of the monolith is partially submerged in water. Both the part above and that under water exhibit widespread biological deterioration. On the exposed part alveolization and carbonate incrustations are present.

The eastern and southern sides are affected by widespread small and large-scale cracks. The horizontal surface presents microkarst erosion and is quite smooth, and damaged by scratches and abrasions caused by people walking and sitting on it. Flaking has resulted in the loss of portions of the worked surface.

We propose to intervene on this monument only on the parts that require urgent treatment, such as flake attachment or consolidation and elimination of the biological colonies on the subaerial part. The removal of all the vegetation surrounding the rock should enable assessment of the preservation states of the south and west sides.

After the (currently only hoped-for) operation to relocate the monolith on dry land in its original vertical position has been planned, a close-up assessment of its state of preservation will be made and a specific conservation project drafted for the monolith, also with regard to its mechanical stabilization.
The Fountain with two rampant lions

The fountain is in a state of severe deterioration. The lions from which it takes its name are today little more than traces on the rock, which is colonized by microorganisms, overgrown with plants and also affected by severe flaking and exfoliation. The preliminary pre-consolidation of flakes and micro-flakes is recommended.

Causes of deterioration

The main causes of deterioration of the Khinis rock relief complex can be ascribed, as in the case of Maltai, to both human action and natural processes. The site's position, with the presence of the river and vegetation, makes it very popular for local tourism, especially on holidays. Despite the presence of a guardian, it is not unusual to see people climbing onto the more accessible reliefs, or find painted graffiti, the remains of bonfires, broken glass that scratches the horizontal surfaces and signs of bullet impacts. (Fig. 81)

Fig. 81. Bullet marks (Niche 9) (photo LoNAP)
With regard to natural causes, the outdoor exposure of these monuments (as for those at Maltai), which are subject to changes in temperature and humidity as well as rainwater in the autumn and winter and groundwater – present at Khinis even in the warmer seasons – is responsible for accentuated biologically determined deterioration. This, together with chemical and chemical-physical factors (disintegration, exfoliation, flaking, concretions, alveolization, chromatic alteration), has led to the reliefs' current precariously deteriorated state.

Wind also contributes to differential deterioration – particularly significant on the Great Relief and the Horseman – and surface erosion, as may be clearly seen in niche 10.

**Conservation treatment**

For the recommended conservation treatment, please refer to the list of descriptions given above, at the end of the section on the Maltai reliefs (pp. Xxxx).

**Conclusions**

The current highly precarious preservation state of the reliefs under study makes it essential that action be taken with the utmost urgency. However, conservation treatment is not sufficient to guarantee a future for these extraordinary works of art. As noted above, on both sites vandalistic and intentionally destructive human activity occurs with increasing frequency. This cause of deterioration could easily be avoided by means of control over the monumental areas by the local authorities – especially in the case of the Maltai reliefs, which, unlike those of Khinis, are not protected by any type of guardian service.

The question of deterioration provoked unintentionally by human actions is a more delicate matter. There are two different aspects. On one hand awareness that certain actions can cause damage to monuments: for example that a bottle broken on the reliefs can irreparably scratch the stone surface, or that climbing on reliefs can cause parts of them to become detached. On the other hand, it should be stressed that many inhabitants of the region are not aware that these monuments are a shared heritage and as such should be treated with respect and handed down to future generations.

This aspect of protection requires an initiative regarding education, especially that of the younger generation, with a programme to raise awareness of local cultural heritage. Long-term public instruction of this sort is the only type of intervention able to guarantee lasting benefits for the preservation of the Khinis and Maltai monumental complexes. The principles of protection,

See Aslan-Ardemagni, 2006.
conservation, respect and responsible enjoyment of the cultural heritage are based on the awareness that they are unique, original and irreplaceable.

As well as damage caused by human agency, there is marked deterioration due to natural processes. The reliefs' outdoor location and their particular location on the rock faces of the Maltai and Khinis mountains makes it difficult to apply the notion of preventive conservation, i.e. "the removal or transferral of the causes of possible damage to the cultural heritage in the environment in which they are located [...]"\(^{21}\), as is done for works of art kept in closed and controllable environments, such as museums. It is clearly not possible to control variation in temperature, relative humidity, and atmospheric phenomena such as wind, rain and solar radiation on the sculpted surfaces, although these are the elements largely responsible for the marked deterioration affecting the reliefs. The stabilization of their current state of preservation through the conservation work described above and their inclusion in an extensive archaeological park project, and thus enclosed in a constantly protected and controlled area, are essential conditions for the rock reliefs' survival. Conservation operations would also allow local personnel to be trained, who would subsequently be able to monitor the preservation state of the reliefs over time. This monitoring, performed by means of close visual examination of the remains (where feasible) and photographic documentation with high-resolution images, would make it possible to review the conservation treatment applied (effectiveness of the materials and application techniques used, treatment duration). Moreover, the constant monitoring of the reliefs would guarantee the drafting of a maintenance program to be implemented periodically. In this way, the results obtained from the conservation interventions would be prolonged over time and the occurrence of new deterioration phenomena limited.
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Morandi Bonacossi, D. 2018, Water for Nineveh. The Nineveh Irrigation System in the


Captions

Fig. 1. Jebel Zawiyah

Fig. 2. View of the town from the plateau in front of the carvings

Fig. 3. Maltai. Panel I

Fig. 4. Maltai. Panel II

Fig. 5. Maltai. Panel III

Fig. 6. Maltai. Panel IV

Fig. 7. Relaxing beneath Panel II

Fig. 8. Remains of a bonfire between panels I and II

Fig. 9. Panel I samples

Fig. 10. Panel II samples

Fig. 11. Panel IV samples

Fig. 12. Alveolization (Panel III)

Fig. 13. Past plaster repairs (Panel III)

Fig. 14. Biological colonization (Panel II)

Fig. 15. Carbon particles (between panels I and II)

Fig. 16. Paint marks (Panel I)

Fig. 17. Flaking and exfoliation on the surface of the carvings

Fig. 18. Flaking and exfoliation on the surface of the carvings
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Fig. 20. Hole dug in Panel I in February 2018
Fig. 21. Discovery of the fragments at the base of the carving
Fig. 22. Sennecherib’s hand from the left side of Panel I found among the other fragments
Fig. 23. Searching for the hand’s original position
Fig. 24. Flake with endolithic cyanobacteria (Panel I)
Fig. 25. Flag painted in 2016 below Panel II
Fig. 26. Man-made abrasions on Panel II
Fig. 27. Microkarst phenomena on Panel II
Fig. 28. Man-made cavity at the base of Panel III
Fig. 29. Flag painted in 2016 on Panel III
Fig. 30. Sennecherib’s tiara on the left side of Panel IV before the 2017 damage
Fig. 31. The tiara after the hole made in 2017
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Fig. 48. Niche 3
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Fig. 52. Niche 6
Fig. 53. Niche 7 (photo A. Savioli)
Fig. 54. Niche 8 (photo A. Savioli)
Fig. 55. Niche 9 (photo A. Savioli)
Fig. 56. Niche a 10 (photo A. Savioli)
Fig. 57. Niche 11 (photo A. Savioli)
Fig. 58. Bullet marks (Niche 9) (photo LoNAP)

Illustration captions
Tav. 1. Panel I - drawing
Tav. 2. Panel II - drawing
Tav. 3. Panel III - drawing
Tav. 4. Panel IV - drawing
Tav. 5. Digital repositioning of several fragments from panel I
Tav. 6. Reconstruction of the figures missing from panel III
Tav. 7. Panel I – deterioration types and specific interventions
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Tav. 16. Niche 12 - deterioration types and specific interventions
Tav. 17. Niche 1 – drawing
Tav. 18. Niche 1 - deterioration types and specific interventions
Tav. 19. Niche 2 – drawing
Tav. 20. Niche 2 - deterioration types and specific interventions
Tav. 21. Niche 3 – drawing
Tav. 22. Niche 3 - deterioration types and specific interventions
Tav. 23. Niche 4 – drawing
Tav. 24. Niche 4 - deterioration types and specific interventions
Tav. 25. Niche 5 – drawing
Tav. 26. Niche 5 - deterioration types and specific interventions
Tav. 27. Niche 6 – drawing
Tav. 28. Niche 6 - deterioration types and specific interventions
Tav. 29. Niche 7 – drawing
Tav. 30. Niche 7 - deterioration types and specific interventions
Tav. 31. Niche 8 – drawing
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Tav. 34. Niche 9 - deterioration types and specific interventions
Tav. 35. Niche 10 – drawing
Tav. 36. Niche 10 - deterioration types and specific interventions
Tav. 37. Niche 11 – drawing
Tav. 38. Niche 11 - deterioration types and specific interventions
Tav. 39. Great Relief - deterioration types and specific interventions
Tav. 40. Horseman - deterioration types and specific interventions
Tav. 41. Monolith: north side - deterioration types and specific interventions
Tav. 42. Monolith: east side - deterioration types and specific interventions
Tav. 43. Fountain with lions - deterioration types and specific interventions