

RED MONASTERY CONSERVATION PROJECT



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RED MONASTERY CONSERVATION PROJECT

FOREWORD

The fall season of the architectural conservation project at the Red Monastery commenced on 14 October 2019 and was completed on the 20 November 2019. The work was carried out in accordance with the Permanent Committee approval of March 03, 2019. The project staff list was as follows:

Directors: Dr. Nicholas Warner and Mahmud al-Taiyyib

Conservators: Theo Gayer-Anderson (stone) and Bianca Madden (plaster)

Archaeological Director: Dr. Gillian Pyke

Scanning Team: Pietro Gasparri, Massimo Carderi, Edoardo Della Palma

Archaeological illustrator: Pieter Collet

Skilled workers: Hamdi Dabbagh, Abdallah Riad, Sherif Rizq, Imam Lashin, Sami Fawzi, Muhammad al-Nahas

Semi-skilled workers: Hani Gineidi, Ashraf al-Badrashini, Muhammad al-Zayyan, Sherif Mounir, Hanna Maher Matta

Trainee conservator: Aouni Naguib Hakim

Assistant conservators: Hani al-Taiyyib and Mustafa Mahmud Ahmad ‘Abd al-Latif

Inspectors: Aisha al-Sayed ‘Abd al-Latif and ‘Amr Mohamed Sadiq

Conservation inspectors: Karam Murad Gad and Aouni Naguib Hakim

Trainee inspectors: Eman Gamal Hassan Abd al-Wahed and Esraa Ahmad al-Samangy

Sohag Taftish: Mr. Galal Kobeisy Ali Ahmed, Mr. Mustafa Agouz and Mr. Gaber Ahmed Hafez

Monitoring: Mr. ‘Ali Ahmed al-Saiyyid [Director of Islamic and Coptic Antiquities, Sohag Inspectorate], Mr. Essam Rushdi [Director of Conservation, Islamic and Coptic Antiquities, Sohag Inspectorate], Mr. Nur ed-Din Mustafa Ahmed [Director, Foreign Missions in Sohag]

Cover Photo: Turning one of the granite column fragments in the nave, October 2019

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1 THE NAVE AND SOUTH HALL

1.1 Anastylis of column fragments



View of the north colonnade of the nave in 2015 (top) and after completion of anastylos in 2019 (bottom)

North side: an additional three loose fragments of granite columns from the structure of the nave were installed on new limestone bases at the east end of the north colonnade. One of these was completed to its full height of 4.13m with fired bricks laid in lime mortar around a stainless steel post to provide support for the planned shelter in this location. The bricks were plastered with a lime plaster of neutral color. One existing fragment, to the west of the north portal, was flipped 180 degrees to its correct orientation. This fragment was supported on a new stainless steel post made of 10 x 10cm angles and 30cm diameter base and top plates. The steel support was the concealed with a covering of fired bricks and lime plaster. Lead was poured under the damaged base of this column to provide extra stability.

West side: One existing fragment, to the north of the central axis of the nave, was flipped 180 degrees to its correct orientation. This fragment was supported on a new stainless steel post made of 10 x 10cm angles and 30cm diameter base and top plates. The steel support was the concealed with a covering of fired bricks and lime plaster. To the south of the central axis of the nave, one existing fragment was completed to its full height of 4.13m with fired bricks laid in lime mortar around a stainless steel post to provide support for the planned shelter in this location.

1.2 Termite protection

During an investigation of the timber superstructure of the central door of the nave, which is set within the limestone rubble wall constructed by the *Comité de Conservation des Monuments de l'Art Arabe* in 1912, a significant infestation of termites was discovered. This infestation has developed since 2011 when the wall was plastered. The timber structure consisted of two parts: a lintel (4m x 30cm deep x 30cm wide) supporting the wall above, and a boarded ceiling behind (an area measuring 3m x 80cm) supported on three smaller timber rafters (20cm x 10cm) with a brick and plaster fill above them.

All the timber in this area was replaced with new 'azizi' wood treated with chemicals to inhibit re-infestation, and all adjacent masonry surfaces were also treated with sprayed termite deterrent. Two new lintels (4m x 30cm deep x 20cm wide) were installed after the masonry of the wall had been braced with a steel structure for safety reasons. These lintels were bolted together with three 10mm diameter stainless steel rods. Following the renewal of the rafters and boarding behind the lintels, the upper surface was painted with bitumen and covered with a plastic sheet, following which the brick and plaster fill above the door was replaced.



Termite damaged lintel and timber platform above the central entrance to sanctuary before (top) and after (centre) replacement and temporary bracing constructed during the timber replacement (bottom)

1.3 Provision of Visitor Information

Three additional bilingual visitor information panels were installed in the nave and south hall. The panels were printed on 2mm thick aluminium sheets (80 x 120cm) with an electrostatic paint finish. The new panels related to the ‘The Traditions of the Church and Monastic Life’, ‘The Construction of the Church’, and ‘The Wall Paintings in the Nave’.

The Traditions of the Church and Monastic Life

According to Church tradition Saint Helena founded the Red Monastery in the first quarter of the fourth century AD. At this time, Saint Sigol was living as an ascetic in the neighboring desert where he was joined in his spiritual retreat by Saint Bishay. Saint Sigol established a monastic community nearby in AD 350. Later the nephew of Saint Sigol, Saint Shenoute, also joined this community. Saint Shenoute became abbot of the Red Monastery in AD 385 and went on to establish a federation of monasteries in this area with over 5,000 monks and nuns. This included a women's monastery at Athribis (modern Sheikh Hamad), and the monastery that bears Shenoute's name, the White Monastery, built in AD 450.

The writings of Saint Shenoute survive in the form of canons that record strict rules of observance for the daily lives of the monks and nuns in his monastic federation in the fifth century. Groups of monks or nuns lived in houses, praying and eating together. The monasteries were also charitable institutions supporting impoverished communities and providing medical care. In addition to twice daily prayers in the church, the monks engaged in other devotional activities such as making baskets and mats while reciting the Psalms. The nuns were occupied with weaving and dyeing textiles. The products of these activities supported the federation economically.

تقاليد الكنيسة وحياة الدير

وفقاً لتقاليد الكنيسة، أسست القديسة هيلانة الدير الأحمر في الربع الأول من القرن الرابع الميلادي. في هذا الوقت كان القديس سيجول يعيش كراهب في الصحراء المجاورة حيث انضم إليه في رهبته الرومية القديس بيشاي أسس القديس بيجول مجتمعاً رهبانياً تقريباً في عام 350 بعد الميلاد. وفي وقت لاحق انضم القديس شينودة ابن عمته إلى هذا المجتمع أصبح القديس شينودة رئيس الدير الأحمر في عام 385م واستمر في إنشاء اتحاد لآلاف الدير في هذه المنطقة مع أكثر من 5000 راهب وراعية في هذه المنطقة مع أكثر من 5000 راهب وراعية وشمل ذلك دير القنسا، في أترابس (الشيخ حمد الحديث)، والدير الذي يحمل اسم القديس شينودة، هو الدير الأبيض الذي بني في عام 450 بعد الميلاد.

عاش كتابات القديس شينودة في شكل فراسخ ونسج فوائده صالحة للعبادة اليومية للراهبان والراهبات في العادة الرهباني في القرن الخامس. كتبت مجموعات من الرهبان أو الرهبان تعويدي في "سنان" الصلاة والأكل معاً وكانت الأديرة أقدم مؤسسات خيرية تدعم المجتمعات الريفية وتقدم الرعاية الطبية. بالإضافة إلى الصلوات اليومية مرتين في الكنيسة، شارك الرهبان في أنشطة تعويدي أخرى مثل صنع السلال والحصر، آلات الخردقة المزارع، كانت الرعايات مفيدة لجمع المنتجات الزراعية. ودعمت منتجات هذه الأنشطة اقتصاد هذا المجتمع.



القديس بيجول القديس بيشاي القديس شينودة
Saint Bishay Saint Sigol Saint Shenoute

صورة أيقونية تالية تاريخية بعبارة القديس الأحمر
Reproduction of an historic icon in the possession of the Red Monastery





The Construction of the Church

The Red Monastery church is principally built of red bricks. There are also numerous stone elements surviving from different periods of construction. These include the heavily decorated north and south portals dating from circa AD 500. Many architectural pieces from older buildings were re-used in the construction of the church, including Pharaonic blocks with hieroglyphic reliefs.

The blocks on display here come from the ruined nave and include column bases, column shafts, and Corinthian capitals as well as cornice and frieze blocks decorated with floral motifs and cosses. It is likely that many of the decorative blocks were originally brightly painted. Some of these pieces were later used as grinding stones, pestles and mortars in the 19th century.

Top: drawing of the exterior face of the south portal (Piet Coblet). The lines of this doorway has depictions of lion-headed goddesses on its underside.

Bottom: photograph of a limestone capital from the church re-used as a mortar, circa 1900 (courtesy of the Griffith Institute, University of Oxford, Soame Clarke archive). This capital was conserved and placed on a re-erected column shaft in the nave in 2015.

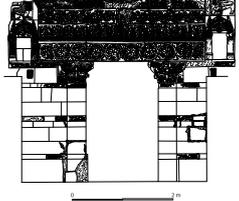
تشيد الكنيسة

تم بناء كنيسة الدير الأحمر بشكل عام من الطوب الأحمر، ولكن هناك العديد من عناصر الحجر الباقية من مراحل مختلفة للبناء، وهذا يشمل البوابتين الشمالية والجنوبية المزخرفتين بشدة والتي تعودان إلى حوالي عام 500 ميلادية. قد تم إعادة استخدام العديد من القطع المعمارية من مباني الأبنية القديمة تشيد الكنيسة، وهذا يشمل على شكل حجرية فرعونية عليها زخارف فرعونية.

الكتل الحجرية المعروضة هنا جزءاً من صحن الكنيسة المهدوم ولتضمن على قواعد الأعمدة وهدومها والتيجان الكورنثية للأعمدة. بجانب الزخارف البروزة أعلى الجوارب والمزينة بزخارف وديرة ومطارد، من المرجح أن العديد من كتل الكنائس الحجرية التي تظهر على كتلة قبة كاتدرائية وأحياناً استخدمت بعض هذه القطع في القرن التاسع عشر كزخايف (حجارة لظلمين) أو كإيقون ومطرفة.

في الأعلى رسم لواجهة البوابة الجنوبية من الخارج (بييت كوبليت). على الخطوط المنحنية من الأعمدة يوجد نقشون لحيوانات رأس الأسد.

في الأسفل صورة أيقون أيقون من كنيسة تم إعادة استخدامه كقوة في نحو عام 1900 (هدية من جمعية هيرفيلد بجامعة كورنيل، ريتشيلد سومرز كازي)، الحفاظ على هذا التاج وإعادة وضعه مرة أخرى أعلى صحن عمود تم إعادة تشييده في صحن الكنيسة في عام 2015.








The Wall Paintings in the Nave

Paintings of monumental crosses, seated rosettes, stars or heronbeak, and holy men adorn the medieval walls of the nave below the original gallery level of the church. The decoration of the north wall continues inside the modern extension of the sanctuary at the east end of the nave. While their quality and style differ, the composition appears self-contained, not yet fully integrated into the architectural and multiple painting phases. Similar content to these paintings appear in spaces, niches, niches, and small chapels, in medieval churches across the Mediterranean basin and Africa.

At the standard level, the first program (A) includes a register of three large crosses with intricate geometric ornamentation (left on the west wall and two on the north wall). Although the framing device used for the crosses differs, three architectural components (spandrel, archivolts) draped over the central "horizontal zone" and the representation of garlands in the form of beak and pinnacles. Additional smaller crosses are found near the base on the north wall. The style and technique of this program suggest they are part of the same phase as the crosses on the facade of the sanctuary.

The second program includes three crosses (B) at the west end of the nave on the west wall and one on the north wall. These crosses are smaller and less ornate than those on the north wall. They are arranged in three quarters by spandrel or crosses. The row of three crosses (C) with ornate and garlands possibly relate to the same phase of painting as this group of crosses. Monochromatic crosses of red on the north wall (D), unlike its original ornamentation found in triangular niches, suggest an additional connection to monastery illustrations.

The third program includes depictions of saints on heronbeak (E) and holy men (F). The style and arrangement of the three saints on heronbeak suggest they were part of at least two separate painting phases. The central figure of the three figures (right) may need to be regarded, but they may represent specific biblical figures. Holy men important to the Coptic Church. An inscription near these paintings identifies in part one of the saints: "The heronbeak saints." Through the church, the same scene appears in multiple iconographic, dating between AD 1114-1122. These fourteenth-century paintings might be one of the final planned decorative programs at the Red Monastery church.

اللوحة الجدارية داخل صحن الكنيسة

الزخارف الجدارية داخل صحن الكنيسة تتكون من عدة مجموعات من اللوحات الجدارية. هذه اللوحات الجدارية هي من العصور الوسطى وتتضمن صليبات ضخمة، زخارف مثل قبة النورس، ورجال مقدسين. هذه اللوحات الجدارية هي من العصور الوسطى وتتضمن صليبات ضخمة، زخارف مثل قبة النورس، ورجال مقدسين. هذه اللوحات الجدارية هي من العصور الوسطى وتتضمن صليبات ضخمة، زخارف مثل قبة النورس، ورجال مقدسين.

في المستوى القياسي، البرنامج الأول (A) يتضمن سجل من ثلاث صليبات ضخمة مع زخارف هندسية معقدة (يسار على الجدار الغربي واثنين على الجدار الشمالي). على الرغم من أن الإطار المستخدم للزخارف يختلف، فإن المكونات المعمارية (المنطقة المحيطة بالزخارف) مغطاة فوق المنطقة المركزية "أفقية" وتمثيل الأضراس في شكل قبة النورس. صليبات إضافية أصغر حجمًا موجودة بالقرب من قاعدة الجدار على الجدار الشمالي. أسلوب وتقنية هذا البرنامج تشير إلى أنه جزء من نفس المرحلة التي صليت فيها على الواجهة الخارجية للكنيسة.

البرنامج الثاني يتضمن ثلاث صليبات (B) في الطرف الغربي من الجدار الشمالي وعلى الجدار الغربي. هذه الصليبات أصغر وأقل زخرفية من تلك الموجودة على الجدار الشمالي. يتم ترتيبها في ثلاثة أرباع بواسطة قوس أو صليب. صف من ثلاث صليبات (C) مع زخارف وهدوم محتملة قد تكون متعلقة بمرحلة الرسم نفسها. صليبات أحادية اللون حمراء على الجدار الشمالي (D)، على النقيض من زخارفها الأصلية التي وجدت في نيشات مثلثية، تشير إلى اتصال إضافي مع مخطوطات الدير.

البرنامج الثالث يتضمن تمثيلات لصلوات على قبة النورس (E) ورجال مقدسين (F). أسلوب وترتيب هذه الصليبات الثلاثة على قبة النورس يشير إلى أنها كانت جزءًا من على الأقل مرحلتين منفصلتين من برامج الرسم الجداري. الشكل المركزي من بين الثلاثة (يمين) قد يحتاج إلى مزيد من الدراسة، لكنهم قد يمثلون شخصيات بيبليزية محددة. رجال مقدسين مهمين للكنيسة الكاثوليكية. نص مكتوب بالقرب من هذه اللوحات الجدارية يحدد في جزئية من هؤلاء القديسين: "القديسين على قبة النورس." من خلال الكنيسة، نفس المشهد يظهر في مخطوطات أيقونية، تتراوح بين 1114-1122. هذه اللوحات الجدارية الأربعة عشر قد تكون واحدة من البرامج النهائية للتزيين في الكنيسة الدير الأحمر.



WEST WALL: Location of paintings
الجدار الغربي: أماكن اللوحات الجدارية

NORTH WALL: Location of paintings
الجدار الشمالي: أماكن اللوحات الجدارية





2 THE TOWER

Additional visitor information was installed in the northeast and southeast rooms on the ground floor of the tower, with the intention of using these rooms as a small visitor center. The northeast room was supplied with images showing the scope of the conservation activities in the church carried out by the American Research Center since work began at the monastery in 2002. A stainless steel lectern was also provided in this room as a support for the 2016 book on the Red Monastery edited by Dr. Elizabeth Bolman. The southeast room contains archival images relating to the church, and a flat screen television in a new timber cupboard for the screening of a short video related to the history of the church and the conservation project carried out by the American Research Center. All the images in both rooms were supplied in glazed picture frames.



Panoramic view of southeast room of tower, ground floor, after installation of visitor information and screen in cupboard



Panoramic view of northeast room of tower, ground floor, after installation of visitor information and lectern

3 THE SOUTH PORTAL

Conservators Theo Gayer-Anderson and Hani al-Taiyyib led the conservation of this carved limestone portal assisted by conservator Karam Murad Gad.

3.1 Conservation history

Until 1912, the south face of this portal was completely covered by the construction of the north wall of the tower and its associated barrel vault running east-west. At this time, the *Comité de conservation des monuments de l'art Arabe* removed the north wall of the tower, supporting the masonry above on a new arch made of lightweight hollow blocks. The *Comité* also removed half of the transverse barrel vault, supporting its upper edge on a steel channel, and removed all the brickwork under the large relieving arch above the portal. Subsequent to the work of the *Comité*, at an unknown date, some poor quality masonry replacements were made on the west jamb of the portal, presumably due to the need to swap out water-damaged blocks. In 2015, as part of the ARCE project, a number of limestone block replacements were made on the west jamb and south face of the portal, restoring the original coursing of the masonry. The broken lintel was pinned to a 10 x10cm stainless steel angle running behind it - now concealed by the timber framing of a door that was installed at the same time. In 2017, a stub of surviving masonry from the north wall of the tower, on the east side of the portal, was removed in order to provide access for the cleaning of the eastern niche. The Italian wall-painting conservators had also carried out a test cleaning in 2016 on the carved face of the lintel, revealing some of its polychromy.



The South Portal after the intervention by the Comité in 1912. North face (left) and south face (right)

3.2 Condition and observations

Following cleaning of the top of the portal in this campaign, it appeared that a significant quantity of brick masonry had been removed from the area above the lintels spanning between the jambs, presumably to reduce loading on these elements. The hole had subsequently been filled with debris. Rather than replace this void with solid masonry, a small, brick, relieving arch was constructed over the void, with three courses of brick above it and the top levelled off with a new layer of lime plaster.



The void above the portal after cleaning (top, seen from west) and after repair (seen from balcony to south)

The north face of the portal had experienced considerable deformation over time, particularly on its eastern side. The cavetto cornice at the top of the portal on this face had also been deliberately hacked off. The portal had a history of inappropriate repointing with cement and had been further disfigured by the installation of conduits for electricity. Both elevations were suffering from sulphation resulting in a dark brown insoluble crust forming on the surface of the stonework. This had caused significant damage to the surface of the stones' fabric due to the interaction with ground water. The lintels and top sections of the door jambs were found to have hydrocarbon accretions associated with incomplete combustion of oil lamps or candles. This resulted in the formation of a black sooty layer with tar products having penetrated the substrate of the stone.

All surfaces of the portal were originally covered with a thin coat of lime plaster over ashlar blocks that had been toothed to receive the plaster. It was suspected that polychromy would be in evidence and, as cleaning progressed, it became clear that there was polychromy on most of the carved detail as well as fragmentary polychromy on surviving sections of plaster. On the carved details, polychromy

survived that was applied directly to the surface of the stone as well as on a white ground. Red, black, and yellow ochre were the colors used for the decorative scheme.

The assembly of the decorative stonework of the south elevation of the portal requires further study. It may be noted, however, that there is a qualitative difference in carving and decorative approach between different elements that suggests that some of the blocks may be reassembled or adapted from other architectural installations while others were purpose made for this context. The carvings of animals located above the niches to either side of the portal can be tentatively identified as lions on the basis of surviving fragments of carving that resembles a mane.

3.3 Treatment methodology

The portal was treated as follows on all its surfaces:

- All areas were first dusted with soft bristle brushes and then given a light wash with water and sponges
- Modern cement pointing was carefully removed using tungsten tipped chisels
- The stonework was then cleaned using a paper tissue poultice with 7% ammonium carbonate
- A paper pulp poultice with 5% ammonium carbonate was used to remove thicker deposits
- Some secondary cleaning was carried out to even the levels of cleaning using a paper tissue poultice with 5% ammonium carbonate
- Deep pointing was carried out using a pozzolanic lime-based mortar (1 lime, 2 coarse sand, 1 coarse brick)
- Open joints in adjacent brickwork were repointed using a lime-based mortar (1 lime, 2.5 coarse sand, 0.5 stone dust).
- Open joints within the stonework were repointed with a lime-based mortar (1 lime, 2.5 fine sand, 0.5 stone dust)
- Missing areas of lime plaster were completed with a lime-based render (1 lime, 1 fine sand, 1 stone dust, 1 tafla)



Detail of carved lintel of south portal before (top) and after (bottom) conservation



South face of south portal before conservation



South face of south portal after conservation



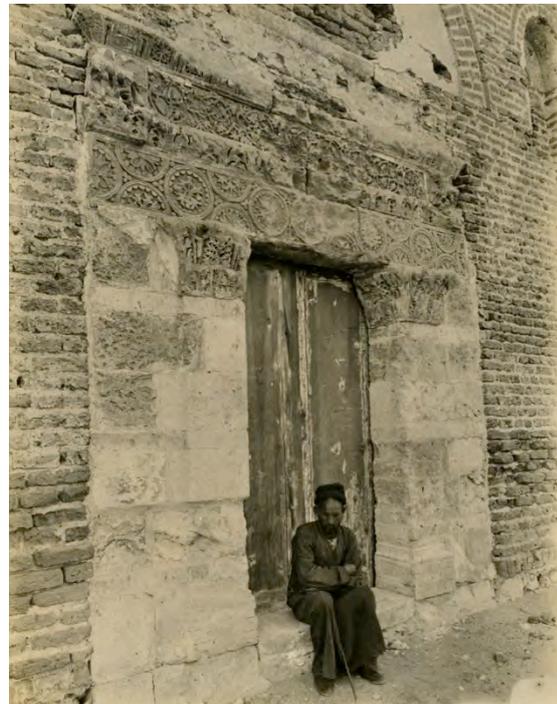
Inner face of south portal before (top) and after (bottom) conservation

4 THE NORTH PORTAL

Conservators Theo Gayer-Anderson and Hani al-Taiyyib led the conservation of the north face of this carved limestone portal.

4.1 Conservation History

At the end of the 19th century the North Portal was not in use, having been blocked with a random collection of spolia including column drums and cornice blocks. The *Comité* removed this blocking in 1912, carried out a number of limestone ashlar replacements (perhaps using re-cut old stones), and installed a new timber door. A significant amount of original plaster remained under the relieving arch above the door until 1996, when a SCA-appointed contractor removed it during a program to repoint all the façades of the church with cement. In 2015, as part of the ARCE conservation project, a number of limestone block replacements were made in the portal, and a new pair of timber doors was installed. In 2018 the Italian team conserved the inner (south) face of the portal and internal jambs, revealing traces of the original polychrome decoration on a thin coat of lime plaster.



The exterior of the North Portal in 1897, and after conservation by the Comité in 1912

4.2 Condition and observations

The external lintel of the door bears historic traces of having been scraped to collect stone powder for use in sympathetic magic – a practice more often associated with ancient Egyptian temples. The capitals and the decorative frieze were all historically treated with an oil or varnish, seemingly postdating the traces of polychrome that were discovered during conservation as it was found on broken as well as historic surfaces. The oil or varnish application had crosslinked with the underlying polychrome and stone fabric making it extremely difficult to reverse without the loss

of the underlying surface. The same layer of sulphation from airborne pollutants was found to have covered and disfigured all surfaces, as was the case with the south portal. The stonework at low level is still affected by ongoing decay associated with the absorption of water-borne salts, although the situation has been stabilised since the introduction of the pavement surrounding the church in 2018. In general terms, the exterior of the portal has been damaged by continuous abrasion from windborne sand (as it faces the direction of the prevailing wind) as well as increased anthropogenic damage due to its exposed location. The abrasion has disproportionately affected the carving above the lintel as this was executed in a softer stone.

With respect to the carving, two interesting details may be noted. The first of these is the fact that the upper cornice of the entablature of the portal returns on its west side (presumably replicated on the other side as well), indicating that the face of the original first phase perimeter wall of the church was set back from its present line. This seems to be confirmed by variant sizes in the brickwork of the wall, with the later medieval rebuild being executed in considerably larger bricks. The second point refers to the carving of what can be identified as lions (as on the South Portal) to either side of the main lintel. These retain fragmentary traces of the carving of their manes and curving tails, and are interlaced with foliate elements.

As on the South Portal, cleaning has revealed the existence of polychrome decoration using the same color palette with the addition of a green paint. Further investigation is necessary to determine whether the application of green paint is an original feature of the decoration.

4.3 Treatment methodology

The portal was treated in the same manner as the South Portal (see 3.2 above).



The exterior of the North Portal in 2016 after preliminary conservation



The exterior of the North Portal in 2019 after completed conservation

5 THE WEST WALL

Conservators Bianca Madden and Mustafa Mahmud Ahmad ‘Abd al-Latif led the conservation of the remaining section of un-conserved wall plaster on the west wall of the church at its southern end above the Chapel of the Virgin, assisted by trainee conservator Aouni Naguib Hakim.

5.1 Conservation History

In 1996 an attempt was made by the SCA to repair a vertical crack in the west wall, running through the wall to the immediate south of the stub of brickwork remaining from the now lost southern wall of the nave. This consisted of removing an area of original brickwork and replacing it with modern brickwork and timber stitches. As the work failed to address the problem, a new repair was carried out in 2015 when a reduced number of timber stitches were installed. At this time, a group of original cornice blocks was also installed above the area of the repair. In 2016, Italian conservators carried out a small test cleaning of the plaster in the area above the Chapel of the Virgin.

5.2 Condition and observations

This section of the west wall provides valuable architectural evidence for the structure of the staircase that once occupied the southwest corner of the church. Some of this information had been lost owing to the 1996 intervention, and one of the objectives of the works carried out this campaign was to integrate the surviving sections of plaster from within the staircase in such a way as to highlight its interior. At the same time it was necessary to effect a seamless join between new work and the main part of the wall to the north that had previously been conserved by the Italians. A number of graffiti survived on the plaster of the wall of the staircase, which may yield useful historical data.

This focus of the conservation work was as follows:

1 A large area of plaster (25 m²) on the south side of the west wall above the small Chapel of the Virgin Mary, which included five clear graffiti texts as well as some splash marks, and fragments of letters/texts. This area was once the side of a staircase that led to the roof of the church, which accounts for the presence of the graffiti here.

2 A strip of plaster measuring approximately 45 cm wide and running the full height of the wall between the Chapel of the Virgin at the south corner of the nave and the area of plaster conserved in previous Italian campaigns on the west wall. The alignment of this wall, that once separated the nave of the church from construction to its south (including the staircase to the roof), is defined at the upper level by the remains of brickwork toothed into the west wall of the church.

5.3 Treatment Methodology

The conservation work carried out consisted of:

- cleaning to clear the surfaces of a build-up of dirt deposits and encrustations, largely made up of dust, soot, calcite crusts and bird lime, as well as modern red paint and splattered cement on the area next to the Chapel of the Virgin

- securing detaching plaster layers associated with areas of loss and delamination from the substrate
- repairing plaster losses to secure the areas and to avoid leaving dust/dirt traps and areas for birds to roost – all of which cause deterioration in the plaster
- toning in new repairs to match existing treatments and to reduce their visual impact

The repairs also help the wall read coherently as a whole, and tie in visually with the work on the previously conserved areas of plaster. The repair work included consolidation of the masonry substrate around the window opening from the staircase prior to replastering.

The materials used for the conservation work largely followed those used in the previous Italian campaigns at the church:

Detaching wall plasters were secured using a lime-based grout developed for the consolidation of wall plaster (PLM-AL). Further stabilisation was carried out using edge repairs and as well as fills using lime mortars. The lime mortars used varied in the aggregates used (brick dust, sands of different grades and stone powders) depending on the area, the mortar selection followed the previous Italian methodology to ensure a coherent finish to all of the walls.

Ammonium carbonate was used in gel form to remove and reduce the dirt deposits and encrustations – this was used at a lower percentage than in the previous campaigns - 5 and 10 % with contact time with the plaster depending on the dirt levels but varying between 10 -30 minutes. This had the same cleaning effect as the higher concentrations used in the previous work but with a less aggressive action. All surfaces were cleared of solubilized dirt, deposits and gel residues using brushes, sponges and water sprays. If necessary, in areas of heavier dirt/deposits, once the surface was thoroughly dried, cleaning could be repeated using the same methods to achieve an even result. A final clean of all surfaces was undertaken with dampened cotton swabs to ensure that any remaining gel had been cleared from the surfaces.

Following the stabilisation, cleaning and repairs, final presentation was undertaken. The new repairs were toned as necessary, using earth pigments in water, to achieve a final appearance that was visually sympathetic to the surrounding areas of original plaster.

5.4 Treatment of the Graffiti

The six graffiti texts were consolidated with a 5% Paraloid B72 solution in acetone, before surface cleaning, particular attention was paid to cleaning the areas around them to allow them to read more clearly. During the conservation process, it was revealed that a black text within an area of a larger smudged red text is executed on a very thin white plaster above the red text. The blurred appearance of the red text is partly due to this covering skim of plaster but it appears that it may also have been deliberately smeared in a cleaning attempt or in preparation of the plaster to place the black text.



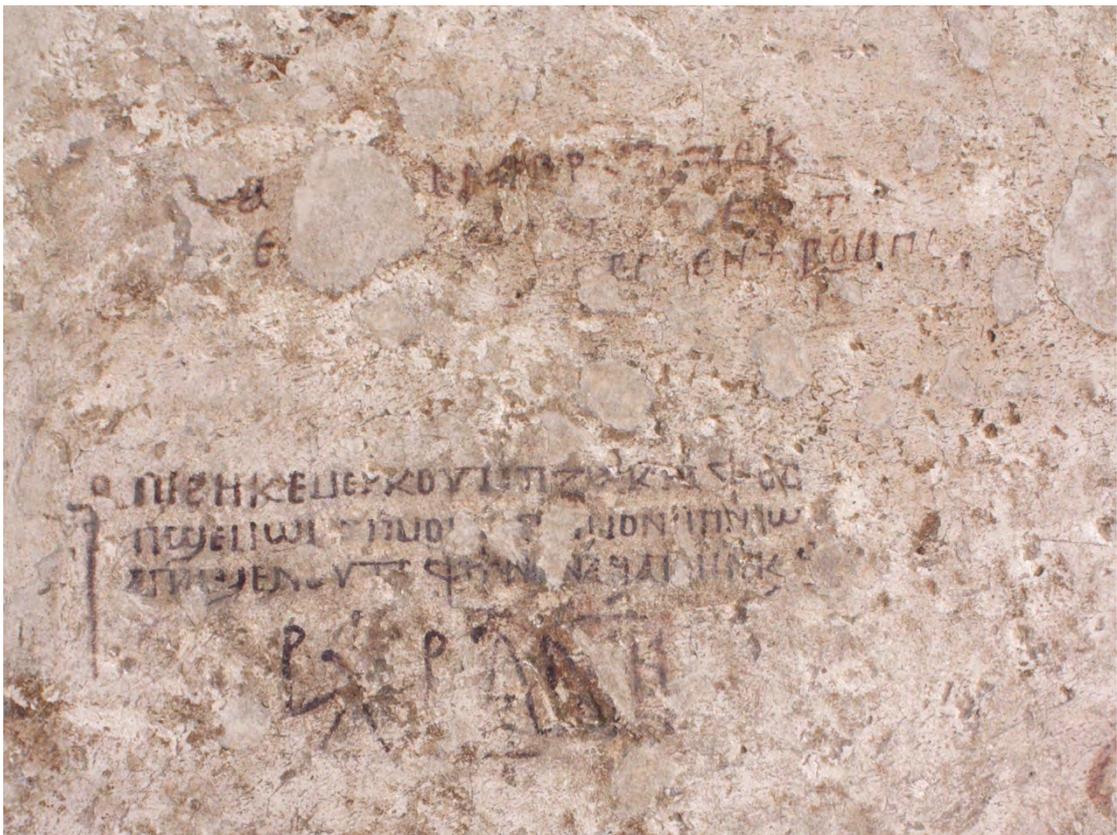
The west wall plaster before (top) and after (bottom) conservation



The strip of wall plaster next to the Chapel of the Virgin before (left) and after (right) conservation



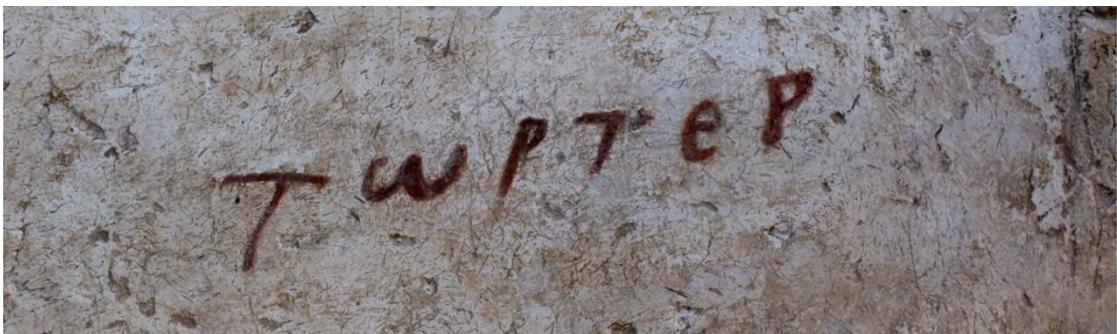
Location of graffiti on staircase wall



Graffiti 1 and 2 before (top) and after (bottom) cleaning



Graffiti 4 and 5 before (top) and after (bottom) cleaning



Graffiti 6 before (top) and after (bottom) cleaning

6 CLEANING ARCHAEOLOGICAL AREA

The work in the archaeological area of the Red Monastery comprised cleaning in preparation for the 3D laser-scanning conducted by Pietro Gasparri and his team. Gillian Pyke and a team of Egyptian assistants carried out the cleaning between 1.12.2019 and 4.12.2019. The strategy followed that employed in the archaeological areas at the White Monastery ahead of photogrammetry (2018) and 3D laser-scanning (2019), which yielded very successful results. Throughout the site, all loose bricks, stones and ceramic, as well as a moderate amount of modern refuse, were removed and walls, floors and other features cleaned with soft brushes.

The pottery collected during the course of the original excavations, stored in a sherd garden at the north end of the site, was removed to outside the margin of the excavation area, next to the modern enclosure wall of the monastery. During this process, a visual assessment was made by Gillian Pyke, who paid particular attention to the date range of this material. It was found to be predominantly of Byzantine (5th-7th century) date, the types notably consistent with pottery of similar date at the monastery within the Repit temple at Sheikh Hamad. Later pottery was rare but present, types generally consisting of transport vessels of early medieval (9th-10th century) date. No glazed vessels were observed. A single tiny copper alloy coin (fig. 2) was also retrieved from this area, the very small size (diameter 9 mm) of which is suggestive of a Byzantine date. The date range of these finds is consistent with what is known about the main flourishing of the monastery.



Large building at centre of archaeological area, looking southwest.



Copper alloy coin, probably of the Byzantine period.

7 SCANNING, PHOTOGRAPHY, TOPOGRAPHIC SURVEY

The fieldwork component of 3D scanning the church and archaeological area of the Red Monastery, with associated high-resolution photography and topographic survey, was successfully carried out by Pietro Gasparri and his team between 02.12.2019 and 09.12. 2019. The archaeological area had previously not been included in the scanning and recording work carried out at the monastery in 2015. The main purpose of the scanning was to provide a complete and detailed post-conservation record of the state of the church and its surrounding site that, in the case of the church, could also be easily compared with the data deriving from the 2015 survey.

Two different levels of detail were used in the scanning: a high level for the internal elevations of the north and west walls of the church (a resolution of 1 mm/pixel) and a medium level for the other parts of the archaeological area as well as the main church (a resolution of 2 mm/pixel). Three complementary pieces of equipment were used to integrate the digital information: a phase shift laser scanner (FARO Focus 3D 120 laser scanner), a topographic total station (Leica Flexline TS02), and a high-resolution digital camera (Eos 5D Mark IV Canon camera with calibrated lens). The work was carried out not only from the ground but also from higher levels in order to survey all surfaces not directly visible from the ground. Additional photographs were taken using a retractable pole to a maximum of 4.5 meters from the ground, with the camera remotely controlled. Inside enclosed areas, a combination of artificial and natural light was used during the photographic recording in order to optimize the color and shadow balance within these spaces. Outside it was desirable to avoid strong contrasts in light, and so early mornings and evenings were chosen as the best times to carry out the recording work.

The final results of the work will only be available after a period of four months, which is the time needed to carry out the full integration of all digital data and the preparation of specific outputs from the project. It is expected that the scans will provide detailed information that will be of considerable use in future monitoring of the fabric of the church, including potential structural movement.

Technical specifications of equipment

Laser Scanner Focus 3D S120: A high-speed 3D laser scanner for the detailed measurement of volumes, surfaces and colors, the Focus 3D S120 can survey one million points per second (maximum speed 976,000 points/sec), from a distance of 0.6 to 120 meters. The high resolution of the scanner is a function of its very low ranging noise (0.5-1.1 mm to a distance of 25m), defined as a standard deviation of values about the best-fit plane for measurement speed of 122,000 points/sec. The Focus 3D 120 is able to acquire automatically the color of scanned objects through its built in camera.

Total station Leica FlexLine TS02 plus: The Leica FlexLine TS02 plus Manual Total Station is ideal for standard measurement tasks and was used to create a single model of the church and archaeological area, combining the outputs of other devices.

Eos 5D Mark IV Canon digital camera: The EOS 5D Mark IV is a high-performance digital camera with a full-frame sensor with 30.4 megapixels. The camera was also equipped with calibrated lenses for photogrammetric use and to obtain the highest definition of surface textures. This additional photographic survey, in addition to the information obtained from the laser scanner, is fundamental for the recording of the elevations and sections of the church.



Pole photography inside the sanctuary (left) and shading the scanner in operation in the archaeological area (right).

8 ARCHAEOLOGICAL ILLUSTRATION

Pieter Collet recorded the inscribed pharaonic blocks re-used in the structure of the church by tracing. These included a threshold block in the central entrance to the sanctuary, the lintel of the South Portal, and a small block in the south jamb of the entrance to the tower. Another block fragment, built into the lapidarium display was also drawn. The blocks seem to be Ptolemaic in origin.

In addition, Collet recorded by photogrammetry and drawing a large number of the loose carved limestone architectural pieces from the church, built into the lapidarium display and into the south wall of the khurus of the sanctuary. These will be included in a catalog of the decorative limestone fragments from the church that will be the subject of study by a specialist.



P. Collet tracing an inscribed pharaonic block re-used as a threshold in the church.