Dakhleh Oasis Project
Columbia University
Excavations at Amheida 2006
Architectural Conservation Works

Work was carried out from 11 to 26 February under the direction of Dr Nicholas Warner with the assistance of Inspector Magdi Ibrahim Mohamed and Conservator Baha'a Goma'a Ahmed. Conservation interventions were made at two buildings on the site: the House and the Pyramid.

1 The Roman House

The temporary shelter built over the main space of the house was removed, and the loose brick screen walls around the interior were dismantled to allow for conservation of the wall paintings to proceed (see separate report). Examination of the mud brick structure of the building revealed that the walls have further deteriorated through damp infiltration and insect damage since last year.

New brickwork was used in the reinstatement of the missing south wall of the painted main room of the house. This followed the original brick dimensions of 8 x 34 x 17cm but without the inclusion of straw/*tibn* (to avoid termite infestation). The existing bonding pattern was replicated where possible, although the original Roman brickwork is of a variable character with inconsistencies in sizes and coursing of bricks. Elsewhere, new mud brick blocking walls were built to divide the excavated from the unexcavated areas and to create a series of protected compartments within the area of the house to separate different areas in the backfill (see plan). The mortar used in the consolidation works was a mud mortar made from a combination of imported *tafl*, old crushed fragmentary bricks, and a small percentage of fly-ash (*osromil*).

The painted room was backfilled to its full height with clean sieved sand, and the temporary roof was reinstated to act as a further deterrent to unauthorised digging. In the recently excavated schoolroom, another temporary roof was installed of *jarrid* on a timber substructure. Another blocking wall was constructed to protect the largest area of inscribed plaster, and two smaller blocking walls were constructed under the staircase.

Future work:

The decision as to how much of the house should be reconstructed or consolidated is dependent on whether the structure is left accessible or backfilled after documentation is completed.

2 The Pyramid

Work was concentrated on consolidating the north-east and south-east corners of the pyramid, which had been seriously damaged by the penetration of robbers' holes. These holes had caused the collapse of significant sections of the corners, leaving the remains in a highly unstable condition. Some clearance of the robbers' holes was carried out to establish a secure base for new brickwork, but threat of collapse prevented a full excavation of these holes from being carried out. A limited excavation of the south-east corner revealed human remains, either present due to a secondary burial or to animal activity (see Archaeological Report). An investigation of the large robbers' shaft immediately to the south of the pyramid proved that this shaft is substantially blocked by fallen rocks, and that it would be hazardous to reopen it as the rock is extremely friable in this area. This shaft was accordingly backfilled.

New bricks, matching the dimensions of the original Roman bricks but without the inclusion of straw (to avoid termite infestation), have been used in the consolidation (8 x 17 x 35cm after cleaning and squaring up). The existing bonding pattern (English Bond of alternating stretchers and headers) was also replicated in the new brickwork. The mortar used in the consolidation works was a mud mortar made from a combination of imported tafl, old crushed fragmentary bricks from the collapse of the pyramid, and a small percentage of fly-ash (osromil). The line of the south face of the pyramid was established through excavation, while those of the north and east faces were still visible above ground level. The new brickwork was stepped to achieve maximum structural effectiveness, and severely wind-eroded bricks on the faces were replaced with new bricks wherever a secure bond between old and new brickwork was required. The brickwork was carried up to a height of 1 metre on the north-east corner, rising in the south-east corner to a height of 2.22 metres which formed the base for the original angled setback of the pyramid. The setback itself was reconstructed to a height of 1.2 metres above this base line. A total of 5,000 bricks were used in the consolidation of this side of the pyramid.

Future work:

Further limited consolidation of the upper part of the eastern, now stabilised, section of the pyramid is recommended (see photo). In order to permit archaeological investigation of the area at the base of the pyramid on its western side to proceed without risk in the future, further interventions are recommended. To preserve at the same time as much as possible of the original appearance and silhouette of the pyramid, it is suggested that a solid base be constructed to a probable height of 1.8 metres. This will be built on secure foundation courses on the perimeter, but stepped over and built upon the existing collapsed brickwork to create a 'belt' around the base of this section of the pyramid. This should have sufficient mass to prevent

structural collapse. It is not recommended to rebuild the entire structure to its original height owing to the known fragility of the bedrock and the risk of further collapse.

Future consolidation of other buildings on the site

Two other standing structures on the site would benefit from conservation treatment. These are a tower to the north near the village and an internally vaulted pyramid tomb in the southern necropolis (plans attached). The various problems associated with these structures (failure of vaults / absence of lintels / missing brickwork / cracks requiring timber stitching) should be addressed as soon as the opportunity arises.

Dr Nicholas Warner