Saving Bayt Clarke: a Mud Brick Masterpiece by the Nile

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"The neighbourhood in which I have carried on building operations is one which is as yet fairly untouched by the pestilent tourist. It is very poor, so that speculators do not turn up and erect mills or such like edifices. …Things remain primitive and traditional."

Fig. 1: Portrait of Somers Clarke, Building News 58, 1890.

Thus wrote the English architect Somers Clarke (fig. 1) of his choice of location for the house he built for himself beside the Nile near Elkab in 1906. The house still stands and is the only surviving example of his work in Egypt (fig. 2). Not only that, it is the earliest surviving mud brick structure built by an architect attempting to practice what he preached, namely the use of sustainable and environmentally sensitive technology to create appropriate architecture. This cause was later to be made famous by Hassan Fathy, but Somers Clarke can be considered a pioneer of this particular trail.

Clarke (1841–1926) was best known for his construction and restoration of churches in Britain and his adherence to the principles of the Arts and Crafts movement. It is less well known, however, that he lived a parallel life in Egypt from 1890 until his death in 1926, working as an archaeologist and constructing a number of significant buildings here. Clarke's historical interests are underscored by the fact that, from 1881, he was a Fellow of the *Society of Antiquaries* in London and, from 1902, an honorary member of the *Comité de Conservation des Monuments de l'Art Arabe*. It was his deep knowledge and appreciation of the architectural history of Egypt, extending back to the Pharaonic period, which informed his building activities. This knowledge was manifest in two important publications. The first, entitled *Ancient Egyptian Masonry, the Building Craft*, was published posthumously in 1930, and remains one of the standard references for the study of ancient Egyptian architecture. Even its title provides clear evidence for the author's preference for construction technology over art history. The second was the volume *Christian Antiquities in the Nile Valley*, which appeared in 1912. For the purposes of understanding his approach to building with traditional forms and materials the latter may be considered the more significant of the two.

In *Christian Antiquities*, Clarke established a typology of designs for Coptic churches, including the plan of a type of church that is only to be found between Aswan and Cairo. The plan is for a multi-aisled, single-storey, building based on a square domed module capable of infinite extension. The simplicity of the method of construction of such churches, and the use of multiple domes supported by pointed arches and piers to create what he considered to be a picturesque interior, clearly made a major impact on Clarke, who was subsequently to emulate the design directly in his own architecture. It is visible in the first commission Clarke received in Egypt in 1899 for St. Mark's Church at Aswan,

built of sandstone rubble and fired brick. This was demolished in the 1980s to make way for the present Coptic Cathedral of Aswan. The relatively simple architecture of St. Mark's was to be further stripped of ornament in Clarke's next project: his own house.

The Virtues of Mud

Clarke decided to settle semi-permanently in Egypt in 1902, and four years later started to build a home there. He chose mud brick as his primary construction material because of its long history of use in Egypt, the undeniable environmental benefits it conferred, and its low cost. Clarke enumerated the advantages of mud brick and the value of traditional architecture in his seminal article on the subject, "The Use of Mud-Brick in Egypt" which appeared in *The Cairo Scientific Journal* of 1908:

> Nature has provided a blazing sun which quickly dries and hardens the mud, and permits it to be made use of as a very tolerable building material, in a land where rain is not to be feared. Unfortunately, the craze for novelty for novelty's sake has invaded Egypt. Things are sought for, not because they are sensible, suited to the climate, or reasonable in themselves, but simply because they are novelties. This has been especially the case as regards building. The old type of house, so well suited to the exigencies of the climate, gives way to the most ridiculous, bastard Europeanisms.

Clarke's article, aside from its passages praising the environmental and moral superiority of earth architecture, contains the first detailed ethnographic description to appear in print of the methods used to create elliptical vaults, domes, and pointed arches with mud brick. All the processes involved are clearly documented, from collecting and transporting the mud, to moulding, drying, and stacking the bricks, to traditional methods of setting out and sequences of construction. The article is also accompanied by a number of explanatory line drawings and includes the design of a prototype mud brick railway station that was constructed at four stations on the Upper Egyptian line between Luxor and Aswan.

Bayt Clarke is entirely created from mud brick domes constructed without formwork. In its final manifestation, it had 27 domes, most of which stood six metres high, and occupied a built area of 1,000 square metres including external terraces. As Clarke lived here as a solitary hermit with only the rare visitor, it seems likely that the house was built as a 'folly' to gratify his own architectural interests and to experiment with space and form. In a way, it can even be considered as a built manifesto of his commitment to traditional building techniques. Sadly, no notes, design sketches or construction drawings have survived. Although evidence of the construction process is scant, it is a certainty that Clarke employed local masons on the project who are seen in one of the few archival

Fig. 2: Bayt Clarke at Elkab seen from the river Nile. Photo by Izzet Keribar/ Lonely Planet Images, 2008.

Fig. 3: Two domes under construction over the entrance portico. Anonymous photographer, c.1906, courtesy Griffith Institute, University of Oxford, Somers Clarke Mss.19.40.

photographs to survive showing the building of two of the domes over the entrance portico of the house (fig. 3).

The house stands on a rocky promontory on the east bank of the Nile, today set back approximately thirty metres from the river (fig. 4). At the time of construction, the land adjacent to the river was still subject to a partial annual inundation, and so the choice of a site sufficiently elevated to avoid flooding was of vital importance. Although the house is set out at right angles to the Nile, it commands a bend in the river with clear sightlines both up and downstream for a considerable distance. There are three distinct yet linked parts to the building. At the centre, occupying the highest part of the terrain, are the main living quarters with an entrance portico to the north (A on fig. 4). On the lower ground to the east, connected to the main building by an elliptically vaulted corridor, is a service block and courtyard (B on fig. 4). These two parts of the house were the first to be constructed in 1906. The third component to be built, between 1909 and 1912, lies to the west of the central block. It consists of a single large space that is built up on a dramatic buttressed podium close to, and directly overlooking, the river. This became Clarke's master bedroom (C on fig. 4). All three sections of the house share the same construction vocabulary: mud brick masonry, plastered with mud, set on a limestone rubble and mud mortar foundation and plinth.

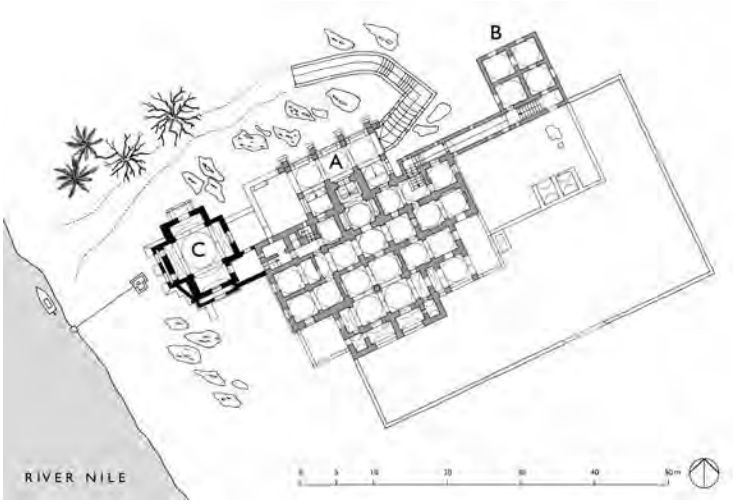

Fig. 4: Site plan of Bayt Clarke showing main residential block (A), service block (B), and master bedroom (C). Author's drawing, 2010.

The north façade of the main block is symmetrical. The projecting entrance is located on axis, fronted by a portico of five domes supported on piers and pointed arches (fig. 5). Some elements disturb the symmetry of the composition, if not its overall monumentality: notably a terrace on the west side of the portico, the descending vault of the corridor leading to the service quarters to the east, and the curving ramp and stair that lead up to the entrance portico. This ramp and stair originate near the river, which would have been the principal point of arrival when the house was built. Placing the entrance portico on the north ensures that this side of the building is kept as cool as possible: the prevailing breeze from the northwest is further cooled by the shade of the portico before entering the main building.

One curiosity of the construction of the portico is the heavy mud brick buttressing of the piers on the northern side. The buttresses must have been part of the original design, as the piers on their own would never have been able to withstand the lateral thrust of the domes and arches that make up this space. They were, however, not bonded with the piers supporting the arches of the portico, creating a point of structural weakness. The voids behind the spherical pendentives of each dome were filled

Fig. 5: View of house from the north-west. Anonymous photographer, c.1937, courtesy Egyptological Association of Queen Elisabeth, Brussels.

with large earthenware jars (placed upside down) in order to reduce the overall weight of the roof structure and, at the same time, increase its thermal insulation capacity.

Fig. 6: Interiors of the north (bottom) and south (top) lantern domes. Author's photographs, 2008.

The expressive domes and pointed arches of the portico serve as an introduction to the vaulted architecture of the interior of the house that is elsewhere concealed on the exterior. Entering through a massive panelled wooden door with a pointed arch fanlight above it, the visitor climbs three steps under a barrel-vaulted outer vestibule to arrive in an inner vestibule. This is a square space in plan, topped by a high semi-circular dome resting on a raised octagonal drum with arched windows (fig. 6). The transition of the dome from square to circle is achieved by means of simple arched squinches. The next space sequentially is also crowned by a dome similar to that over the vestibule, but taller. The shift from the vestibule and the interior of the house is further expressed through changes in material and lighting conditions: the vestibule has a mud plaster finish that gives way to a white lime wash inside. The second lantern-dome also marks the centre of a cross-axis that runs east-west through the house that is essentially an access corridor which would otherwise receive no direct natural light or ventilation. The remaining domes and arches over this corridor match the others in the house in terms of their scale: consistency of construction takes precedence over spatial hierarchy here and elsewhere in the building. The corridor provides access to not only the main living spaces of the house, which are approached by double doors on the central north-south axis, but also to the main bedrooms and service spaces.

The main living areas of the house lie on the south side of the building, and considerable effort was expended in order to protect them from the full force of the sun by screening them with terraces covered by barrel vaults (fig. 7). The continuation of the central axis from the entrance portico is here resolved in a balcony with a fine panorama of the Nile. The principal living area of the house occupies four dome modules in plan (fig. 8). In the main section of the house a total of four bedrooms open off the circulation corridor, three of which occupy double dome modules and the other a module of one and a half. A fifth, single module bedroom is accessed from an intermediate space to the northeast of the corridor.

The grand scale of the building is nowhere more apparent than in Clarke's own master bedroom suite, added in the second phase of

Fig. 7: View of house from south-east showing Clarke's tomb at base of terrace and use of shading vaults. Author's photograph, 2008.

Fig. 8: View of living room prior to 1925. Anonymous photographer, image hand-touched by Clarke, 1906-1925, courtesy Griffith Institute, University of Oxford, Somers Clarke Mss.11.033.

Fig. 9: View of the master bedroom block from the southwest showing screen wall construction. Author's photograph, 2008.

Fig. 10: Views of the east side of the portico before and after collapse. Author's photographs, 2007 and 2009.

construction to the west of the main block and directly overlooking the Nile. Supported by a massive stone rubble platform, it has a five-metre diameter central dome with spherical pendentives flanked on four sides by pointed arched recesses (iwans). The dome is top lit by four small circular oculi. A special treatment is reserved for the external facades to the south and west that would have borne the brunt of the force of the sun (fig. 9). Here, Clarke constructed screen walls, with large pointed arched openings within them, some sixty centimetres away from the faces of the main block. The space between the two walls is covered with a small, open-ended, barrel vault. The screen walls thus simultaneously shade the main structure and provide an updraft of cool air immediately in front of the window openings in these façades: an effective form of natural airconditioning.

The service spaces of the house are all located on its north flank. The bathroom, toilet, and stair to the roof are accessed from a small corridor running east-west as an extension of the main circulation corridor. A ramped, barrel-vaulted, corridor connects the main house to a servant block on the east side, housed within a cluster of four domes. The roof terrace has, at its centre, the superstructure of the two lantern domes over the entry vestibule and corridor, crowned by inverted pots.

Clarke died in 1926, and was interred in a modest mud brick grave next to his home. Since 1937 the Belgian archaeological mission, working at Elkab, and latterly at the early rock art sites of Qurta and el-Hawsh, has occupied the house on a seasonal basis by agreement with the Antiquities Service to whom ownership of the house devolved upon Clarke's death. After the lapse of time, and only periodic maintenance, two sections of the building suffered structural failure. The two northern domes of the servant block collapsed in 1985 and, more spectacularly, the portico failed in 2009 (fig. 10). The latter obviously had structural issues from the time of its construction due to the lack of bonding

between its buttresses and piers. This problem was doubtless exacerbated by inadequate provision for the disposal of waste-water from service elements of the building which simply entered the ground near the base of the portico. Other aspects of the building requiring structural remedy included the de-lamination of the mud brick walls screening the main bedroom block that were also not bonded into their parent structure, and the failure of timber lintels throughout the building due to termite activity.

Work in Progress

The need for a major conservation intervention to safeguard the future of this remarkable building was clear from the time the initial survey was carried out by the author in 2006, and by 2010 sufficient funds had been raised to allow this project to commence. Major donors included the King Baudouin Fund of Belgium, the Yale University Expedition Fund, and a number of private individuals and organisations both in Egypt and abroad, including members of the Egyptian Belgian Business Association.

The programme of work was initiated in February 2011 with the demolition of collapsed elements of portico and stabilisation of the remaining structure with timber supports (fig. 11). Seventy thousand new mud bricks in two dimensions suitable for wall and vault construction were ordered from a local brick-maker. In April 2011 an entirely new plumbing system was installed including a new remote septic tank, and a new pumped supply to the kitchen and bathrooms of the house. All pipework was run externally to minimise future risk from any possible leakage. At the same time, the collapsed domes of service block

Fig. 11: View of dismantling and stabilisation works in the portico. Note the use of pots in the fill of the pendentives. Author's photograph, March 2011.

Fig. 12: Masons at work on the reconstruction of the portico. Author's photograph, October 2011.

Fig. 13: General view from east showing reconstructed piers of portico. Author's photograph, October 2011.

were rebuilt, allowing for the completion of all the service components of the structure. At the end of September 2011 it was possible to begin working on the reconstruction of the portico itself courtesy of a grant from ARCE's Antiquities Endowment Fund. New reinforced concrete pads were poured extending under the location of the buttresses and piers into the area of the portico. This was done to spread the loading of the domes as much as possible, and the concrete was entirely encased within the new brickwork of the portico. The mud bricks used in the work proved to be harder than locally fired bricks: they survived being thrown onto hard ground from a height of six metres! The piers were constructed in single blocks of masonry together with their respective buttresses up to the level of the springing of the arches carrying the domes (fig. 12). The structure will be left as it is not only until funds become available for the continuation of the project, but also to allow drying time before the imposition of any further loads (fig. 13).

Figure14: Aerial wiring in the living room. Photograph by Theo Gayer-Anderson, March 2011.

Future Conservation

Part of the problem of working at Bayt Clarke is its vast scale. This means that seemingly reasonable square-metre or piecework rates rapidly mount up to considerable sums. An example of this would be the flat roof of the house that extends over an area of 600 square metres. This has to be stripped back, and new surface laid to reconfigured falls ensuring adequate runoff for the occasional tempestuous downpour. Another would be the forty windows and doors, a good percentage of which require new timber lintels to replace termite-damaged ones as well as refurbishment. Add to that the installation of hundreds of metres of electrical cables run in subsurface trunking to replace the current 'aerial' method of distribution as the house has never been properly wired (fig. 14), and new light and power sockets. Add to that the cost of making good interior surfaces and repainting with lime wash (2,700 square metres), replacement floor tiling, external re-plastering and the host of difficulties encountered in any conservation project multiplied by a factor of ten!

Some of these desiderata may seem superficial, but others most definitely are not. There are serious risks if the roof is not attended to soon, and the screen walls are not pinned back to the master bedroom block. The electrical wiring is unsafe as well as unsightly. The completion of the superstructure of the portico including the limestone monumental Arabic inscription that fronted it, which miraculously survived the collapse of 2009 (fig. 15) is another priority. All of this represents a major fundraising challenge, or as some like to call it, 'opportunity'! Attempts have been made on the part of the author to raise the profile of this unknown masterpiece through registration and publication. The process of registering the building on the list of protected monuments of Egypt was proceeding well until its derailment by the political events of the January 2011 Revolution that severely affected the smooth running of the Supreme Council of Antiquities.

Fig. 15: Monumental carved limestone inscription reading: "Oh you Opener of Doors, open for us this best of doors!". Drawing by Theo Gayer-Anderson, March 2011.

Bayt Clarke continues to serve as a base for the Belgian Mission to Elkab and the surrounding area. It is important that this function be maintained in the future to ensure a sympathetic reuse of the structure. It remains a hope that financial backing for the restoration will continue so that this landmark building in the history of twentieth-century architecture of Egypt will survive for years to come as a testament to the vision of its maker and the material of which it is made.

The author would like to thank Dr. Dirk Huyge, Director of the Belgian Mission to Elkab, and Dr. Luc Limme, Secretary of the Egyptological Association of Queen Elisabeth in Brussels, for their support in fundraising for the project in Belgium and Holland, and all donors who have contributed thus far to the conservation of the house. All construction work was carried out by Mahmud al-Taiyyib and his team, to whom I am very grateful for their perseverance in the face of difficulty. Those interested in making a donation to the conservation of Bayt Clarke can contact the author at: njwarner@aucegypt.edu.

ARCE's Antiquities Endowment Fund was established through a grant from the United States Agency for International Development (USAID).