BRICKS AND BRICK BONDING IN THE MONASTIC ARCHITECTURE ON KOM A IN NAQLUN

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The richness of mud-brick architecture explored over the years at Naqlun prompted the preparation, in 2003, of a corpus of brickwork bonding and building materials based on the domestic and residential architecture currently under exploration in sector A. Building G was analyzed for this purpose and, to broaden the base for analysis, also the walls of structures east and south of the church, AE.1 and AS.1-3 (mausoleum included) respectively, were investigated (for the situation on the site map of these structures, cf. *Fig. 5* on p. 146 above). These structures are all contemporary and dated with considerable probability to the end of the 10th century.[1] The walls of the oldest part of the monastic complex, AA.30.1-3, were also included in the study in view of the presence of many typical features. This architecture, excavated in 2000 and 2001,[2] is dated to the same period as the keep (Building A in the early phase), that is, to the 6th century.[3]

Unfortunately, most of the walls analyzed for the purpose of the corpus were not preserved in full height, thus hindering proper interpretation.[4] For objective reasons, some of the walls were analyzed only in part.

THE BRICKS

Building AA.30.1-3 was erected of two kinds of mud brick,[5] both dark gray in color. The bigger kind (32 x 16 x 12 cm) had small quantities of gravel added to it. Smaller bricks (24-25 x 11-12 x 6-8 cm) were produced with large amounts of chopped straw as temper. The dark gray mud bricks from Building G also contained varying quantities of vegetal temper. Exceptional amounts of chopped straw, or else chopped straw and gravel, were added to the mud brick used in the construction of walls in room AE.1 and in the mausoleum. The mud used for bricks in the south and east walls of room D.8 is light gray (also with chopped straw added). The size of the bricks from Building G, room AE.1, the mausoleum

1) Cf. W. Godlewski, *PAM XIV, Reports 2002* (2003), 164-165, Fig. l.
2) W. Godlewski, *PAM XII, Reports 2000* (2001), 150-154; id., *PAM XIII, Reports 2001* (2002), 160-166.
3) Cf. W. Godlewski, *PAM XI, Reports 1999* (2000), 130; id., *PAM* XII, op. cit., 150-151.
4) The study concentrated on structural walls, important from the point of view of architectural planning, to the exclusion of obviously second-rate walls and walls too damaged for interpretation.
5) Cf. Godlewski, *PAM* XIII, op. cit, 161-162.

and room D.8 fall within the range: 22-24 x 10-12 x 4-6 cm.[6)]

Baked bricks were used only to reinforce the bottom parts of doorjambs. Single bricks of this kind occasionally replaced mud bricks in the wall structure, but this had no impact on the overall quality of the building. Thus, the two courses of baked headers (25 x 11-12 x 7.5-8 cm)[7)] set on edge and separated by a layer of mortar, found between rooms G.5 and G.6 (Building G) were truly exceptional. They looked very much like a solid foundation under a wall (?), of which no trace remains.

THE MORTAR AND PLASTER

A gray mud mortar with chopped straw added as temper was used to bond the bricks; in the walls of room AE.1 and the mausoleum, the temper consisted of chopped straw and gravel. Only the baked brick construction between G.5 and G.6 was bonded and coated with a so-called cement mortar, that is, a very hard lime mortar of grayish color.[8)]

As far as plaster is concerned, it was not preserved merely on the mostly burned walls of the complex AA.30.1-3.[9)] Elsewhere plaster is prevalent. Three kinds can be distinguished based on the material: plaster made of desert clay, mud plaster and lime plaster.

The first kind always contained a very fine vegetal temper. Dominating among them was a fine plaster of yellowish-cream color,[10)] but darker ones, orange-pink and brownish-yellow, were also encountered.[11)]

Mud plaster was also applied frequently, each time mixed with either fine or thickly chopped straw. The color ranges from light gray,[12)] through dark gray (same color as the bricks)[13)] to dark grayish-green and brownish.[14)]

Traces of lime plaster were recorded on the walls of some of the rooms of Building G. The north wall of room G.8 was covered with a so-called cement plaster with fine gravel added. The presence of a very fine, cream-white lime plaster without temper, smoothly finished like gypsum, was noted on the north wall of Building G (the outer wall on the street side) and on the south wall of the niche under the stairs in room G.2.

6) Gray (mud) bricks of identical size (24 x 12 x 6; 22-23 x 9-12 x 5 cm) were used in the 9th century to build the walls of House X in Tebtynis, cf. M.-O. Rousset, S. Marchand, "Secteur nord de Tebtynis (Fayyoum). Mission de 1999", *AnIsl* 34 (2000), 416, 422; M.-O. Rousset, S. Marchand, D. Foy, "Secteur nord de Tebtynis (Fayyoum). Mission de 2000", *AnIsl* 35 (2001), 436.

7) The presence of baked bricks of identical size (24.5-25 x 11-12 x 7.5 cm) was also noted in the remains of a construction related to water use in House X in Tebtynis, from a phase dated to the end of the 6th century, cf. Rousset, Marchand, Foy, "Mission 2000", op. cit, 418.

8) Identical mortar was used for the floor in room G.5.

9) Godlewski, *PAM* XIII, op. cit, 163, 166.

10) In Building G: west wall of room G.2, west wall of room G.5, south wall of room D.5, outer wall on the west side of corridor G.1, all the walls of rooms G.6 and G.3.

11) The former on the north, east and south walls of the mausoleum, the latter in room G.7.

12) North wall of room G.2.

13) In Building G: the underplaster on the north wall of room G.2 and the south wall of room G.3; the plaster on the outer wall on the west side of corridor G.1 and the plaster on the east wall of room G.5.

14) The former: room G.4 in Building G; the latter: east wall of room AE.1.

Most of the plaster was about 1 cm thick or slightly less. Only some of the desert clay plasters were laid in much thinner layers.[15)]

The plaster was colored occasionally. The plaster in room G.5 was whitewashed unevenly. The same was done in room G.7, except for the upper part of the east wall, which was painted black. Traces of a purple dye were observed on the so-called cement plaster on the north wall of room G.8.

THE BRICK BONDWORK

The walls in the monastic compound demonstrate considerable variety in terms of both the building material and the construction technique. Beside mud bricks of more or less standardized size and composition, the brickwork includes occasionally bricks produced less carefully, fragments of bricks and bricks taken from other structures.[16)]

The regularity of brick courses seen in the face of the walls does not always, especially in the case of flat-laid courses, correspond to the arrangement of the bricks in the core, where there was much more leniency, the bricks and fragments of bricks being laid askew and thickly filled with mortar. A very common technique, even in the better-made walls, was to fill the space between rows of bricks with a thicker or thinner layer of mortar (sometimes mixed with crushed brick). This allowed the thickness of the walls to be increased.

The architectural remains on Site A and its borders are relatively diverse as far as the brick bondwork is concerned. Particularly noteworthy is the bond seen in the walls of building AA.30.1-3,17)[17)] and especially room AA.30.2 (*Fig. 1.A*). The bottom parts of the walls (76 cm thick) were raised of big bricks laid in courses of alternately headers and stretchers. At a height of c. 110 cm, the big bricks were replaced with smaller ones, although the rhythm of header and stretcher courses was retained for the next four courses. The upper parts of the walls demonstrated alternating courses of headers on edge and stretchers, which was a bond made popular in Egyptian building in Graeco-Roman times and common in the architecture of later periods.[18)]

Other walls of considerable thickness (66-70 cm, i.e. three brick lengths) from Site A, relatively rare on the whole,[19)] were erected of flat-laid bricks, alternating headers and stretchers. Differences are to be noted only in the plan of particular courses (*Figs. 1. B and C*).

Some of the walls of moderate thickness (47 cm, i.e. two brick lengths) also represent the flat-laid brick bondwork. The southern section of the wall between rooms G.1 and G.2 (Building G), between the entrance and the staircase, had the west face made of courses of, alternately, stretchers and headers (*Fig. 1.D*). The wall between rooms G.2 and G.3 was made of stretchers alone, with headers every second course solely at the end, near the door (*Fig. 2.E*).

15) West wall of room G.2: 4-5 mm, west wall of room G.5: 3-4 mm, outer wall on the west side of corridor G.1: 2-3 mm.
16) Reused bricks were used mainly for blocking passages, e.g. the large-sized bricks coming from the dismantling of Building A.
17) Godlewski, *PAM* XIII, op. cit., 161-162, Fig. 3.
18) Cf. A J. Spencer, Brick Architecture in Ancient Egypt (Warminster 1979), 137.
19) Only the east and south wall of room D.8 (sector D) and the north, east and south walls of room AE.1.

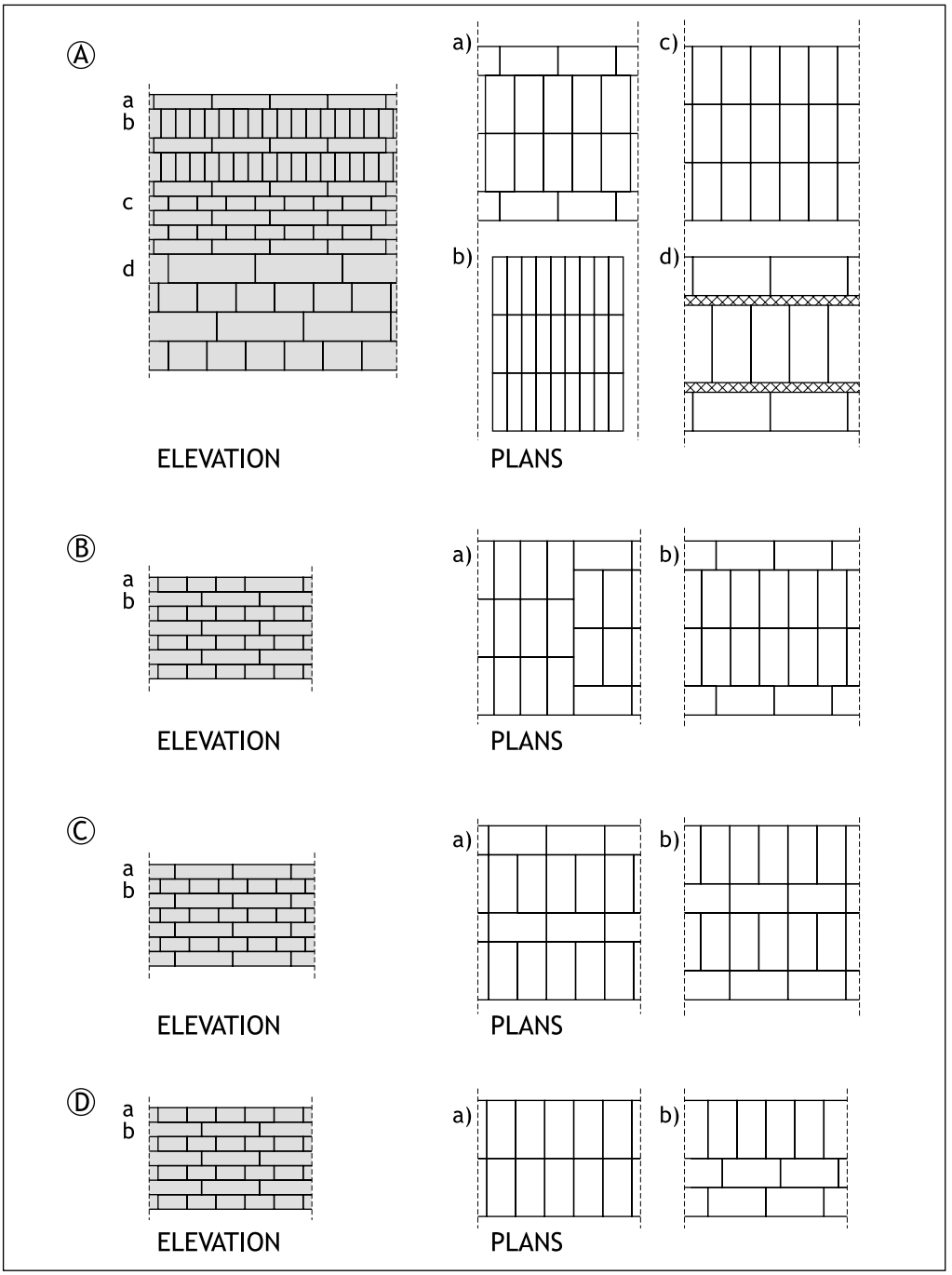

Fig. 1. Examples of bondwork encountered on Kom A in Naqlun (Computer rendering A. Błaszczyk after drawing by Sz. Maślak)

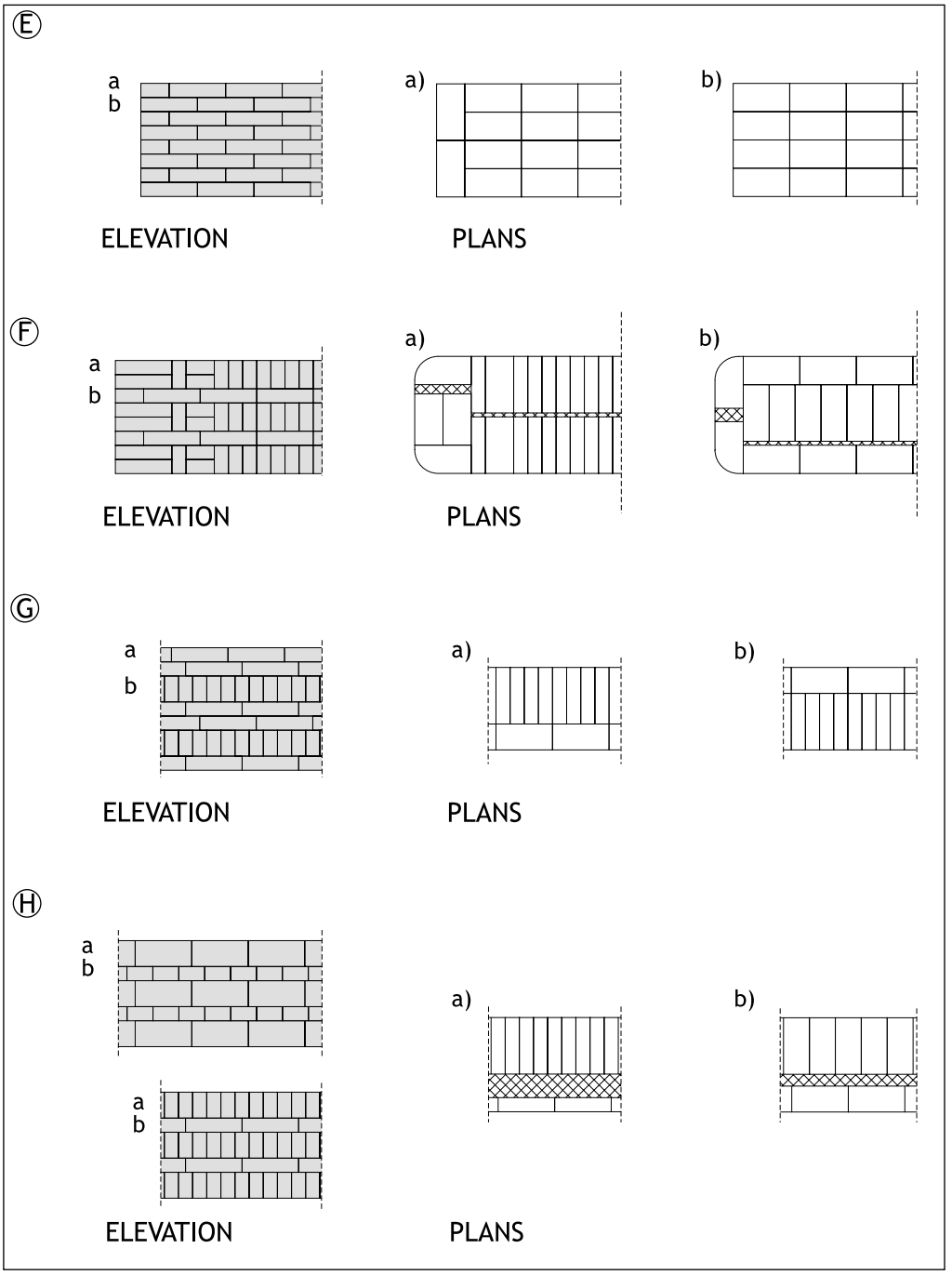

Fig. 2. Examples of bondwork encountered on Kom A in Naqlun (Computer rendering A. Błaszczyk after drawing by Sz. Maślak)

Fig. 3. Examples of different bondwork from the excavations on Kom A in Naqlun (Photo W. Godlewski)

Undoubtedly the most popular bond in the local architecture (especially in Building G) was that which consisted of alternating courses of headers on edge followed by stretchers. Walls in this bond were usually 47-50 cm wide, i.e. two brick lengths (*Fig. 2.F*). In plan,[20] the headers-on-edge course consisted of two rows of headers set on edge, separated by a mortar core, and the stretcher course of two rows of stretchers with a header in between and a mortar core.[21]

Walls built in this bond could have been deprived of the mortar layer in the core in particular courses, e.g. west wall of corridor G.1 (only 45 cm thick) and the west wall of the mausoleum (48-49 cm thick). Thicker walls (52-57 cm) erected in this bond could have instead of the mortar in the core either a stretcher set on edge (in the headers-on-edge course) or a filling of mortar and crushed brick (in the stretcher course).[22]

In walls made of alternating courses of headers on edge and stretchers, as a rule a different bond was observed at the two ends. This bond was based for the most part on courses of headers and stretchers in different arrangements (cf. *Fig. 2.F*).[23] To protect the wall corners from damage, the ends of walls were rounded sometimes (e.g. north end of east wall of corridor G.1, cf. *Fig. 2.F*).

The bonds applied for the thinner walls were also based on alternating courses of headers on edge and stretchers. The west wall of room G.11, which measured some 35 cm in thickness (one-and-half brick length), consisted of courses of headers on edge alternating with double courses of stretchers (*Fig. 2.G*).

Entirely unique brickwork was recorded in a 40-cm thick wall (one-and-half brick length with a mortar band at the core added) separating rooms G.6 and G.7 (*Fig. 2.H*). The northern face of this wall was made up of alternating layers of headers and stretchers, the latter set on edge,[24] while the southern face consisted of alternating courses of stretchers and headers, this time the headers set on edge.

The older and sounder walls were founded directly on bedrock. The walls of Building AA.30.1-3 were erected in this manner[25] as was also the south wall of room G.2. Younger walls were raised on beaten ground, occasionally mixed with animal dung (*sebakh*). In every kind of bondwork the foundations consisted most often of a course of headers set on edge.[26] The similarity to brick building of Pharaonic times is striking.[27] Another similarity to earlier periods is the rarer occurrence of foundations based on a course of headers.[28]

20) The terminology used to describe the horizontal arrangement of particular courses is the same as if courses visible in the face of the wall were being described.

21) The longer section of the east wall of corridor G.1 and the north and west walls of room G.4 were erected in this manner.

22) As in the west wall of room G.6, the west walls of rooms G.5 and G.7 and in the wall separating G.8 from the street between Building G and D.

23) East wall of corridor G.1, west wall of room G.6, west wall of room G.4.

24) Similar bondwork can be seen on a fragment of the east wall of room G.7, the sole difference being that the header courses here were replaced with stretchers.

25) Godlewski, *PAM* XII, op. cit, 151; id., *PAM* XIII, op. cit, 161.

26) The headers set on edge were usually more or less inclined (even passing into headers occasionally), the reason being the need to level the ground for given walls, like in the case of the walls between rooms G.6 and G.7, G.7 and G.8, G.8 and the street, as well as all the walls of the mausoleum.

27) Cf. Spencer, op. cit., 120.

28) Erected on either one or two courses of headers were the south and east walls of room D.8 and the west wall of corridor G.1.