OXFORD EXCAVATIONS AT ANDARIN (ANDRONA): SEPTEMBER 1998

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ABSTRACT

Andarin, ancient Androna, northeast of Hama in Syria is the focus of a new international field project, being undertaken by Syrian (under Dr. A. Zaqquq), German (Heidelberg) and British (Oxford) archaeologists, which plans by means of survey and excavation of the site to distinguish its pre- through post-Byzantine developmental phases. Limited fieldwork at the site was previously carried out briefly in 1905 and in the 1930's. The current project started in 1997 with the topographical survey carried out by the Heidelberg team who initiated excavation of the barracks (kastron) in the following year. During the same 1998 season the Oxford team started excavation of the basalt and brick bath (loutron) opposite, uncovering the upper levels of the building (ca 23 x 40 m). Inscriptions state that the two buildings were erected by the same untitled but obviously affluent individual, Thomas, in and around. A.D. 558. Oxford also commenced study of the water supply and agriculture of the site.

The bath is composed of four main sections (figs. 3-7): 1) on the east lies a paved and colonnaded entrance court of which less than half has now been excavated; finds include wallpaintings and a pot containing sixth-/seventh-century coins. 2) The north section, a main hall with five apses (one seen by Butler), was probably the frigidarium. An inscribed lintel and many pieces of marble were found there. 3) The south section, a complex of apsed rooms incorporating a series of marble-lined pools/tanks, pipes, flues and vestiges of furnaces was probably the tepidarium and caldarium. 4) To the west is an archaeologically complicated service area which requires clarification through further excavation and study. Of these sections, only the entrance court on the east was dug down to floor level, revealing a later curved structure (possibly a kiln) built directly on the Early Byzantine pavement. Pottery finds include fragments of numerous saqiya (water-lifting) jars used to supply the bath. Reports below by M. Mango, C. Mango, N. Pollard.

Study of the water supply of Androna centred on two large reservoirs (both 61 x 61 m) situated southeast and northwest of the site’s circuit walls; industrial slag was found at both locations. The northern reservoir and foggara systems were newly located in 1998. Both reservoirs, whose capacities were calculated, and the related foggaras were probably used primarily for agricultural purposes. Archaeological evidence is being sought for Androna’s noted wine production in late antiquity and an olive pressing complex was discovered outside the north walls. Reports below by M. Decker, C. Salter, A. Wilson.

REPORT

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The new Syrian-German-British field project at Andarin, ancient Androna, plans by means of survey, excavation and study of the site to distinguish its developmental phases from the pre-fourth-century Roman to Early Byzantine periods, while seeking evidence for continuation into the Islamic. This work seeks to clarify the site’s monumental organisation, its social composition, and its economic and military role within the wider context of Syria and the Near East. Previous fieldwork at the site was carried out briefly by H.C. Butler’s Princeton expedition of 1905, which produced a series of plans, and by Mouterde and Poidebard whose aerial photography and commentary formed part of their study of the Limes of Chalcis in the 1930’s.
A pre-Islamic text states that Androna was noted for superior wine production, and trade probably passed via the site which stood on a main east-west road. Situated on the western edge of the Syrian desert, Androna was recorded as a mansio by the late third century and as a kome in the sixth (?); it was probably in ruins long before it was described as such by Yakut in AD 1225. Large by non-polis standards, Androna was further distinguished by numerous communal buildings of the Early Byzantine period, which included the barracks (kastron) of AD 558/9, now being excavated by the German team, under the direction of Prof. Dr. C. Strube.

The contemporary bath (loutron), together with the large extramural reservoirs and related water supply systems form the principal interests of the British archaeologists, who will also investigate Androna's agriculture. Oxford's immediate programme of work includes 1) excavation of the bath extending to contiguous areas such as the street; 2) survey and documentation of the site's water systems and agricultural installations. Kite photography, by R.C. Anderson, will play an important part in the documentation of Andarin where strong and constant winds blow loose soil over the site, obscuring remains which can only be properly seen from above.

The Bath at Androna

The bath was first located and identified by a Greek inscription (fig. 17), as published by Butler's Princeton Expedition in 1905. The building is situated in the centre of the site, just opposite the ruins of the kastron. Of the bath, Butler saw only vestiges of an apse, a rectangular room and what he took to be a large circular room (fig. 2). At the start of the 1998 season little was visible of the bath at ground level. Few traces of walls could be identified as corresponding to Butler's plan, while over the apse a qubbe (now ruined) had been built in which the bath inscription had been reused as a door jamb. By contrast, a brick apse to the southwest of Butler's apse had by now been revealed at some unknown period. The 1998 excavation was carried out horizontally to establish the overall extent of the building; with the exception of part of the entrance court, excavation was, on average, limited to a depth of 0.50 m. and the removal of topsoil (context B1). Architecturally the bath divides into four main sections (figs. 3-7): on the east, an entrance court; on the north, an apsed hall (frigidarium); on the south, a complex of rooms with pools, pipes, flues and furnaces (tepidarium and caldaria); and on the west, a probable service area for water supply.

East Section: entrance court (figs. 3-4, 10-11). On the east lies a paved and colonnaded entrance court of which less than half (14 x 5.5 m) has now been excavated, almost the only area of the bath yet to be dug down to floor level. The area excavated is on the west side of the court and includes a central doorway into the north section of
the bath. The enclosure walls of the court were uncovered on three sides. That on the west formed the façade of the main hall of the bath and is bonded at its extremities with the hall's eastern apse walls (B5, B10); the west wall pre-dates the north and south court walls.

The west wall (B6, B7; W 0.91 m), built of wedge-shaped basalt blocks with a mortared rubble core, now stands three to four courses high (ca. 0.80-1.20 m above the pavement); in the lowest course every fourth block projects. The inner face of the wall, inside the main hall, has been robbed. The doorway (B50) in the west wall has a basalt threshold (B118) and jambs tapering inwards so that its width is 1.38 m on the east and 1.48 m on the west. The doorway was cleared only on its eastern face. The north end of the west wall (B6) is abutted by the north-south extension (B85) of the north wall (B86) of the court. Built of squared basalt blocks with a mortared core, the north wall (W ca. 0.70 m) now stands two courses high (ca. 0.50 m above the pavement). The south end of the west court wall (B7) widens on its west face to form the apse at the southeast corner of the main hall (B8). Its south face was built, without stone facing, against the north brick wall (B66) of the south section of the bath. From the juncture of these two walls, the south court wall (B65; W ca. 0.65 m) extends eastwards. Its masonry is similar to that of the other court walls, but its facing stones vary in size; five have been robbed from the south side.

At 2.50 m from the west wall (B85, B6, B7) of the court a pair of L-shaped piers (B68, B79) built of squared basalt and brick were uncovered. These formed two corners of a peristyle which included a pair of intervening columns, one of which remains standing (B28; surviving H c1.65 m) opposite the socket of the other (B132) now gone. The basalt columns (D 0.31 m), without bases, were socketed into holes let into the pavement. Two wedge-shaped capitals of basalt, presumably belonging to the columns, were found in the court, one loose (B89; lower D ca. 0.30 m), the other reused in a later structure (B104, fig. 11, see below). The original plan of the court can be reconstructed on the basis of this layout combined with the results of a sondage carried out further east which confirmed the symmetrical location of another standing column (B116; surviving H c1.52 m) and pier (B117). The outside entrance to the court was situated several meters further east from the sondage, on the north-south street which ran between bath and kastron. One of the two inscribed lintels now loose (figs. 17-18) probably capped this outer door, on monolithic jambs, rather than the doorway (B50, fig. 11) on the west side of the court leading inside the bath. See below.

Remains of frescoes of standing figures, some barely visible, were found on most of the walls and piers of the court (figs. 11, 22-23; see below). They are particularly well preserved, at a low height only, on the west wall on both sides of the doorway and on the north face of the southwest pier. Profiled marble skirting was also found loose in the entrance area. The court pavement (B84) is of mortared basalt slabs about 0.10 m thick and squared, but varying in size (0.55 x 0.40 - 0.37 x 0.39 m). The pavement appears to have been laid around existing architectural features, such as the south wall (B65) and the L-shaped piers (B68, L79). In the southwest corner of the court (fig. 9) was uncovered a clay pot (B99), namely a saqiya jar (fig. 27.4; see below) still stuck upright
in the earth where a paving stone had been removed. The pot contained four copper Byzantine coins of the sixth-seventh century (see below).

Also partly revealed in the entrance court was a later curved structure (B104) built directly on the paved floor of the court between the two western piers. Its outer diameter as presently exposed measures 4 m and its wall (W ca. 1 m) is composed of reused wedge-shaped basalt blocks — including a stone voussoir and one column capital from the court peristyle — and a brick/rubble fill (fig. 11). The area enclosed by the curved wall (D ca. 1.5 m) was filled with ashy material (B131) which suggests that this may have been a kiln. Kilns of this size and similar shape were built on the pavement of the Byzantine agora of Scythopolis during the Umayyad period.9 Although a capital apparently from the sixth-century colonnade of the court was reused in the curved wall, it is possible that most of this side of the bath entrance court was still standing when the kiln was built and in use. Eventually, the court collapsed; the catillus of a flour mill was found loose with the collapsed material beside the kiln. Excavation of the east half of the court in 1999 may elucidate the complete form and function of the later structure, as well as the dates of its construction, use and abandonment.

North Section: frigidarium (figs. 3, 5, 9, 11). The north section of the bath is a main hall (B32) constructed of basalt and brick, and having five apses (B44, B43, B30, B18, B8). The entire north section appears symmetrically laid out and almost ecclesiastical in plan,10 despite its north orientation. The east wall and doorway (B6, B7, B50) are described above, as part of the entrance court of the bath; the west wall (B19, B20; W 0.92 m) is constructed of wedge-shaped basalt blocks with grey cement. The apse in the centre of the north side (B44), now overlaid by qubbe remains, was that seen by Butler, but contrary to his plan (fig. 2), it is polygonal on the outside (preserved L on NW 1.1 m; on NE 1.3 m). The masonry of this wall (B27) — wedge-shaped basalt blocks with grey cement — is similar to that of the west and east walls and the other two salient apse walls on the north (B5, B38); the northeast apse wall (W 0.67 m) also preserves two upper courses of mortared brick. The two apses on the south (B8, B18) are inscribed in deep, straight walls (B10, B11) built mostly of brick and white mortar, on their inner sides. Nearly directly opposite the east doorway (B50) is a gap (B34) in the west wall which probably corresponds to another doorway (B34); there are sockets on the two inner faces of this doorway. A third doorway, to the south, is discussed below, together with the south section of the bath.

Further excavation may reveal that the north section of the bath was not a single room but an area composed of several smaller rooms. This was probably the frigidarium or cold room(s). The only pool so far visible in the southwest corner (B35) may be a later addition enclosed by two (reused) marble blocks (B12, B13), one with a profiled face; a water channel (B140; 0.14 x 0.47 m) was cut into its back wall (B11). The greatest concentration of decorative material so far found has come from this section, especially from the southwest apse (B18). It includes glass mosaic tesserae from the collapsed upper walls and/or vaults, some of them still embedded in plaster. The size of the tesserae is uniformly small (used for fine work) and there is a range of colours,
including gold. Fragmentary pieces of flat marble revetment were found in relative abundance (a sackful) and had probably covered the lower walls. Most of the marble found in the Andarin bath is Proconnesian. There is also a certain amount of alabaster, which is native to the area of Rusafa. See below.

Later building in the north section comprises the round qubbe and an attached rectangular structure. It appears that the qubbe (B4) was built over the polygonal apse (B27) sometime after the 1905 visit of Butler who does not mention it. Laid out as an elliptical circle, the qubbe was constructed with a wall (W 0.50-0.60 m) of reused basalt blocks, and chips of stone and brick, all set in mudbrick mortar. The upper part of the building was composed of mudbrick which collapsed inside the qubbe. At the entrance to the qubbe along its northwest side a platform (B46) served as a door step and the inscribed lintel to the bath (B29) was reused as a door jamb. To the southwest side of this circular structure was attached an oblong room (B33) extending south and enclosed on the east side by wall B14 (surviving mostly at its north end) and on the west and north by wall B21 built partly on top of the outer west wall (B20) of the north section of the bath. The masonry of B14 and B21 is similar to that of B4.

South section: tepidarium and caldaria (figs. 3, 6, 8-9). The south section of the bath, apparently built entirely in brick, is a complex of further apsed rooms, incorporating a series of marble-lined or plastered pools and/or tanks with pipes, flues and vestiges of furnaces. Thus, these rooms comprised the tepidarium and caldaria. The wall (B10, B11) between the north section of the bath and the northernmost room of the south 8-9 section has deteriorated so much as to obscure the connecting doorway. This latter room (B133, B134), which is long and narrow, has an apse inscribed in its east wall (B66), a doorway (B140a) in its west wall (B15) leading into a small room (B36; see below), and another doorway (B135a), later blocked leading through its south wall (B135, B17) into one of two adjacent rooms, each with an apsed area on the south (fig. 8). The southeastern room (B136; 3.43 x 3.36 m) is enclosed by walls B135, B66, B143 and B144/145 through which a doorway (B145a) leads into a south central room (B107; 3.40 x 2.63 m) enclosed by three other walls B17, B143 and B142/146. The two apsed areas (B107a, B136a) are tiled and appear to be hollow below, indicating the presence of hypocausts. A semi-circular marble-lined pool (B107b; 1.02 x 0.86 c) heavily encrusted with lime deposits, occupies the west side of the apse of the south central room. A loose pipe (D 0.12, L 0.275 m) was found lying against the north wall of B107. Large chunks and loose pieces from tesselated pavements, uniformly of large white limestone cubes were found in these two southeastern rooms — with many chunks found upside down —, and in the area (B124) outside the eastern external wall. Some loose pieces of unusual flooring found nearby were composed of large grey stone inlay.

A doorway (B146a) in the west wall of B107 preserves its stone sill and marble revetment at the base of its south jamb. This doorway leads into B106, the southernmost of three west chambers, which is enclosed by walls B141 and B142/146 and the mass of masonry of the furnace area (B139) to the west; the south wall of B106 has yet to be located. This room has traces of vertical flues in two walls (B141, B142), leading up from hypocausts below, awaiting excavation; an arch with brick voussoirs
(B106a) at floor level opens west into the furnace (B139). Fragments of clay pipes with lime encrustation were found in this area (fig. 14), as were pieces of alabaster revetment and an ivory comb. Directly north of B106 is a pool or tank (B105; 1.9 x 0.92 m) which has rounded corners, a flagstone floor and walls once revetted in marble, some of which remains in situ. To the north of B105 is a room (B36; 2.08 x 1.43 m) with pool (fig. 9), likewise cleared to floor level. The small pool (B140; 0.68 x 1.04 x 2.15 m), sunk in the room's paved floor, has a drain hole (0.075 x 0.1 m) at the east end; a pipe (D 0.125; m) is still embedded at a height of 1.2 meters in the west wall (B37); the other end of the pipe is visible in the space (B41a) behind room B36. Supports (H 44 cm) for a bench stand against the south wall. A thin piece of slate (0.23 x 0.42 m is embedded in the floor. The walls (B11, B15, B16, B37) enclosing the room have three coats of plaster.

To the west of these three chambers (B36, B105, B106) lie what may be the remains of two furnace areas. That to the south is now seen as a rectangular mass of brick masonry (B 87, B129) with a central collapsed area (B139). Wall B128 runs along this structure to the south. Directly north lies a trapezoidal area (B41a) bounded on the west by the brick and stone masonry of wall B26 bordered by a short wall (B41), by wall B11 on the north and wall B37 on the east. B41a is filled with ashy material and may have housed a boiler. In its east wall was embedded a water pipe leading into the pool room B36 (see above); another embedded pipe led into room B133-134.

The exterior south wall of the south section of the bath (B143) was excavated downwards, to about 1.20 m below the surface of the southeast apses (B107a, B136a), and its base, which was not reached, is lower still (fig. 8). The outer face of this wall is covered in painted plaster (a band of geometric ornament in red); this continues around the corner and along the brick façade of B66 which was faced with plaster in imitation of stone slabs (fig. 9), all the way to the south wall of the entrance court (B65).

**W section: service area** (figs. 3, 7, 12-13). To the west, where Butler saw an oblong and a circular room (fig. 2), we found an archaeologically complicated area which requires clarification through further excavation and study. The exact extent of this area was not determined. Butler's oblong room was found to be composed of two parallel brick structures running north-south, (both approximately 7.5 m long), that to the east (B23) partly abuts the north section of the bath. Between that and the second structure to the west (B25) lies a narrow passage (B24, 1 m wide) filled with rubble collapse only partly excavated in 1998; this was blocked at the south end (B122). Against the west side of B25 was built what appears to be a rectangular brick pier (B76; 0.98 x 1.25 m). From this and the edge of B25 two narrow and parallel sloping brick walls (B48; together 1.8 m wide), projecting about 4 m westwards, appear to have been built as a buttress to B25 (fig. 13). At a later stage an ovoid pit (B83; 1.8 x 1.17 m), found filled with rubble, was cut across the south half of B25 and into B48 and B76.

To the south and west of this complex lie other unidentified walls of various construction phases. To the south of the pier B76 runs a wall (B74) of large basalt blocks alternating with brick courses. A narrow channel (B 125; W 0.15 m) and a tapered opening (B126; W 0.285 m) cut across the wall, the line of which continues as wall B127, built of wedge-shaped basalt blocks bonded with mortar, which turns a corner and
continues eastwards. Future excavation may confirm that B127 joined up to wall B128. The nature of the space enclosed by B23-25, B74, B127 and by the furnace area to the east (B87, 129, 139) remains to be clarified. The west half of the west section is harder to interpret. One identifiable unit to the north is composed of an east-west wall (B103) bonded to two north-south walls, B138 (built against B25) on the east and wall B109 on the west (fig. 12). The area enclosed, which is partly bound on the south by the buttress (B48), has a continuous upper surface of brick (B49, B92, B114). Another possible architectural unit may lie to the south where the north-south wall B59 (which continues westward) may be contemporary with the parallel wall B95 to the east; these two walls may be linked at their north end by the contiguous east-west walls B93 and B94. The area thus partly enclosed has a notable subsidence towards its centre. Possibly contemporary with one or both of these two units is wall B88 which extends westwards from north-south wall B109.

Subsequent additions to the west section of the bath now obscure its original configuration. Some of the later walls are more coherent than others. For example, the space enclosed by walls B103, B109, B138 and the buttress B48 was eventually subdivided by a north-south wall (B61) built of reused wedge-shaped blocks set with mud and by the short wall opposite (B113). The doorway (B121) was provided with recesses for a jamb in the short wall and in the pavement below it. The room thus created to the east preserved evidence of occupation. In the southeast corner the *catillus* of a flour mill (B70) was found standing on top of a filled *pithos* (B96; rim D 0.69 m) sunk in the floor (B102), while loose red pigment and lime were found piled on stones on the floor in the northeast and northwest corners, respectively.

Harder to interpret are the curved walls which had suggested a large circular room to Butler. Two main curved walls have been uncovered. While that on the southwest (B71) resembles somewhat the walls of the *qubbe* (B4) built over the north central apse (B29) in the north section of the bath, the other wall (B73), composed of basalt voussoirs (max. L 0.91 m), forms a curve too broad to be part of such a construction and recalls a different kind of installation which may be considered in connection with the water supply of the bath.

There is no sign of a raised aqueduct feeding the bath and the heavy lime deposits on pipes (found in B106/7, fig. 14) and the semi-circular pool (B152) in one southeastern room mean that ground rather than rain water was used. Other finds from the bath are equally relevant to this question. Nearly half of the diagnostic sherds of the pottery found in the bath so far was composed of either rims or button bases belonging to water lifting jars, usually called *saqiya* jars. A complete jar (fig. 27.4, H 33 cm) was found in the entrance court (see above). The button and rope around the projecting rim served to secure the jar upright in a chain or wheel used to lift water from the ground or a river. Similar jars have been found elsewhere in the Levant, especially in Egypt (fig. 15). Water-driven wheels (*norias*) operating on the Orontes today make use of buckets rather than jars; but jars were in use until modern times in Egypt. The jars excavated at Andarin may confidently be placed in late antiquity thanks to the four coins found in the whole jar at the bath’s entrance (see below). The
abundance of such jars on the site (some concentrated in contexts on the west and on the east), nearly all made of the same fabric, indicates the use of a lifting device to bring water to the bath.

It is quite probable that a lifting device was located in the west section of the bath. There, various configurations of masonry resemble water lifting installations in the bath at Abu Menas near Alexandria (fig. 16). Thus, three areas in particular may relate to the water supply of the Androna bath, as follows. 1) The rectangular block B23-25: a treadwheel (max. D 7 m; W 0.75 m) could have been housed in the narrow north-south passage B24 with the two long masonry structures (B23, B25) acting as a casing and with the sloping east-west walls (B48), as a buttress (fig. 13); 2) the rectangular space with a sunken centre (B59, B93-95) may be the site of a well; and 3) the broad curved wall B73 (post-dating the latter, no. 2) may derive from a circular treading floor for oxen used to power a saqiya. At least three successive machines are thought to have lifted the water at Abu Menas. Further exploration planned on the west side of the bath should help to confirm these various possibilities.

**Building sequence of the four sections** (fig. 3). The masonry of these four sections reveals much about the order in which they were built. For the north, south and east sections, this is best seen at the southwest corner of the entrance court (fig. 9). It is clear both that all walls of the south section are bonded -- as seen from the brickwork at the corners of the rooms --, and that the south section was built before the north section whose basalt masonry lacks an outer facing -- as seen between walls B10 and B66 in fig. 9. Less clear is the relation between north and south sections as seen in their common wall (B36?) on the west side. The lifting wheel casing (?) in the west section (B23) is built against the west sides of both north (B19) and south (B41) sections and so must post-date them. Finally, the north-west (B85, B86) and south (B65) walls of the entrance court abut the east walls (B6, B7) of the north section, and so were built later. The court was then paved and the fresco plaster (B80, B81) applied. The coins found in the corner of this court (B99, fig. 9) may provide a terminus ante quem for at least three of the various building phases.

The time lag between the apparent phases of construction of the bath is now impossible to judge, but may be elucidated in the future. The *kastron* was built in 17 months and 10 days. The north section of the bath may simply have been built in stronger, basalt masonry (as distinct from the brick of the multi-roomed south) to support a central dome. At any rate, Thomas claims to have built, not rebuilt the bath (see below), although sometimes such statements can be shown to be exaggerated boasts. It should be noted that the bath is aligned with the churches at the site, rather than with the so-called praetorium (thought by Butler to be earlier Roman) or the *kastron*.

Another question concerns the location of the two inscribed bath lintels (on which see below). That found outside the west gate of the *kastron* (fig. 18) may come from the street entrance of the bath, while the other which was found by the main north apse (fig. 17) may have come from a second entrance opening onto a public square lying between the bath and the so-called praetorium to the northwest. Elsewhere at Andarin,
doorways which are the single surviving part visible of a number of structures are composed of two vertical monolithic jambs supporting a monolithic lintel. Other late antique baths in Syria. Other late antique village baths in northern Syria are located at seven sites in the limestone massif (Babisqa, el-Bara, Brad, Frikya, Guwaniye, Mugleyya, Sergilla, Sinsarah). Of these, that which will undoubtedly be of greatest relevance to the future study of the Andarin bath is the bath at Sergilla (like Androna a site identified by inscription as a kome) which was built by one Julianos and his wife in 473. In his recent study of this bath, G. Charpentier investigated the water and heating arrangements and so was able to propose a new interpretation of functional layout. Water for the bath was lifted from the mouth of the cistern situated to the south and conveyed by elevated stone conduits projecting from the façades to pools within three rooms located on the south and east sides.

The Architectural Finds.
In addition to loose architectural pieces (lintels, capitals, etc.) we also encountered a good range of decorative material in the bath which indicates that it was considered by its builder Thomas to be a prestigious building.

1. Inscribed lintels.
Two inscribed basalt lintels with related texts were found, one in the bath, where it had been seen by Prentice in 1905, and the other in the kastron, where it was excavated by the German team. See Inscriptions by C. Mango below.

2. Marble and other stones.
The two basalt column capitals found in the entrance court (B89, B 106) have the form of a truncated pyramid with a simple upright leaf at each corner. Aside from remains of glass wall and limestone floor mosaics (see above), many decorative elements found loose in the bath were of marble (mostly Proconnesian) or alabaster and comprised the following: pieces of opus sectile paving (fig. 19); a large amount of wall revetment and architectural fittings; part of a profiled cornice; two pieces of profiled skirting; two fragmentary pieces of champlevé carving of a type which enjoyed a vogue at and near Antioch and in Cyprus in the late fifth and early sixth centuries (fig. 20). Smaller foliate pieces cut from limestone and used in another type of opus sectile (fig. 21) recall finds at Pella in Jordan.

3. The frescoes.
Of primary interest are the frescoes found on the inner (west) wall and elsewhere in the entrance court (fig. 11). The most complete fragments flank the door leading into the north section of the bath (fig. 22). Unfortunately, only the lowest level of the walls survives so that merely five pairs of feet and a single foot remain of what was originally a series of standing figures. Some of the feet (shod in a variety of shoes) are in good condition. Two figures wear trousers. There is some shrubbery between the figures and part of a broad vertical red border enclosing roundels with pearled frames, of a type encountered in Palmyrene, Sasanian and other oriental art. On the southwest pier of the court are the feet of a figure standing on a purple globe (fig. 23) who may be a Victory or Tyche. Such figures appear in (third-century) funerary art at Palmyra, two stops away on the Antonine Itinerary. Who the Androna figures represent is an
intriguing question. Contemporary standing figures have been found mostly in religious contexts - as on the walls of the Temple of Bel likewise at Palmyra, converted into a church - and can be identified as saints or church donors, which is not the case here. At Androna they could portray Thomas and members of his family or entourage, as one finds on the bath pavements at Piazza Armerina in Sicily, or typical bathers or personifications, as appear among the painted figures in the bath at Qusayr Amra.22

The Pottery. Nigel Pollard, Institute of Archaeology, Oxford

Over 83 kg of pottery was excavated and recorded in the bath during the 1998 season. Because the excavation was expanded horizontally, to expose the plan of the building, rather than vertically, most of the pottery came from surface cleaning and fairly shallow, disturbed, contexts dating to and after the abandonment of the baths. Over 38 kg of pottery came from the removal of topsoil layers (context B1). Thus there is no clear picture of chronological development within the assemblage.

The study of this pottery is at a very preliminary stage. Nevertheless, comparisons can be made with material from other sites in northern Syria such as Resafa, Dehes and Dibsi Faraj, and, to a lesser extent, sites in southern Syria and Jordan.23 Broadly speaking the material from Andarin is Byzantine and, to some degree, of the transitional period from late Byzantine (sixth-seventh century) to Umayyad.24 Little is definitely Islamic in date, and it is noteworthy that only one small body sherd of glazed ware was recorded. Some of the coarseware may be Umayyad (although there are often disagreements over dating at sites from which comparanda have been drawn) but there is nothing which is definitely Abbasid or later.

1. Identified imported wares.25 These were relatively few, and mostly came from B1 surface contexts. Thus they provide a general overview of what was in use on the site throughout its history rather than dating for specific contexts.

a. African Red Slip Ware. In addition to three small body sherds (all from B1 contexts), three diagnostic sherds were found:

B1 Dr21 rim of Hayes 91C flanged bowl, sixth century
B1 Dr152 rim of large plate, transitional from Hayes 87 to Hayes 105, perhaps later sixth century
B67 Dr81 base of large bowl with relatively low foot and (broken) out-turned rim, Found in two joining pieces with one similar body sherd, form between Hayes 93/94 and Hayes 107, Carthage area fabric, mid-sixth century or a little later? (fig. 24.1)

b. Late Roman C Ware (Phocaean Red Slip Ware). In addition to one small body sherd, six rims of Hayes form 3 (dish/bowl with vertical flanged rim) were excavated (cf. fig. 24.2, B1 Dr 79/80). Most of them were later variants of the form, thus probably early to mid-sixth century. There was one fragment of a stamp from the inside of a Late Roman C Ware vessel, Hayes motif 68, cross monogram with four circle motifs between arms, common on vessels of form 3, and dated c. AD 500 (fig. 24.3, B1 Dr78).

c. Late Roman D Ware (Cypriot Red Slip Ware). One body sherd of Cypriot Red Slip Ware was excavated, broadly datable to the fourth to seventh centuries.
In general the datable imported finewares fit quite squarely within the sixth century. There is nothing which is likely to be of seventh century origin.

2. **Coarseware bowls and basins.** One distinctive group consists of small, relatively shallow and thick-walled bowls, with everted flat rims, sometimes marked by a lip on their inner edge. They are decorated with concentric incised grooves on the rim overlaid by further knife or thumb marks. Their fabrics appear quite homogeneous, with medium fine pinkish to orangey buff coloured clay. There are four clear examples (fig. 24.4 [B1 Dr140] and fig. 24.5 [B1 Dr108]), with rim and body profiles preserved and three possibly related forms. All came from unstratified contexts. Very close parallels appear at Dehes, where, the excavators suggest, they appear in the middle of the seventh century. Other parallels come from Resafa and its environs, where a sixth- to early seventh-century date is suggested. At Andarin there are also distinctive groups of larger bowls and basins, mostly in buff fabrics, including the forms illustrated with sloping sides (figs. 25.1 and 25.3, B1 Dr 121 and Dr71) and steep sides (fig. 25.2, B1 Dr67). There are comparanda for these on north Syrian sites, including "byzantino-omeyyade" assemblages at Dehes.

3. **Cookwares.** These occur in a range of broadly similar brittle red fabrics, some ribbed, some not. Diagnostic sherds suggest roughly comparable numbers of neckless cookpots with handles from shoulder to rim (fig. 26.1, B1 Dr133), and high necked cookpots (fig. 26.2, B1 Dr96). None of the latter preserve remains of handles, although the rims show a similarity to forms from elsewhere which have pointed handles on their shoulders. The difference between these two groups is often assumed to have chronological significance, with the necked types being later. At Dehes the neckless type is said to appear in fifth- to sixth-century contexts and the high necked forms in the sixth century, while the excavators of Dibsi Faraj state that they "seem to be Ommayad". Finally there is a distinctive group of small, hemispherical casseroles with handles and flat rims to take a lid (fig. 26.3, B1 Dr123). These find their closest parallels at Dehes, where they appear in contexts of the second half of the seventh century, although very similar casseroles are found throughout the Byzantine and Umayyad periods. No evidence of cookpots with horizontal ledge handles and rocker decoration has been found in the bath excavation at Andarin. This distinctive group has been found on other sites in the region, such as Dehes and Dibsi Faraj, where it is said to be late Umayyad-Abbasid. Its absence may be significant for the history of occupation at the bath site, although excavation is still at an early stage.

4. **Smaller closed forms.** Relatively few diagnostic sherds from jugs, bottles and small pitchers were excavated, in buff fabrics and brittle fabrics similar to cookwares (fig. 27.1, B1 Dr113, jug; fig. 27.2 B1 Dr107, bottle). Again, there are comparanda from sixth-seventh-century contexts on sites in Syria and Jordan.

5. **Amphoras and jars.** In general a very high proportion of the pottery (over 90% by weight) was amphora and jar, mostly body sherds in fairly homogeneous buff fabrics. Much of this material has not been studied in detail yet, but two very small groups of distinctive material relating to amphoras have been recognized, as well as a large group of water-lifting jars.
a. Riley Carthage Late Roman amphora 1/Hayes Saracha|n Type 5. Nine body sherds of this amphora type were identified, weighing a total of 0.7kg. Most were from B1 contexts, and one each from B67 and B82. This small quantity suggests that it was imported to the site rather than of immediately local production.

b. North Syrian amphora. One sherd (fig. 27.3, B69 Dr150) of what is described by the excavators of Resafa as "North Syrian amphora", with its distinctive reddish-brown painted scroll decoration on a pale buff fabric, was found in the bath excavation at Andarin. Comparable material has been found at and around Resafa, Dehes and Dibsi Faraj. Its place of origin is not known with any great certainty, but it is found in sixth- and early seventh-century assemblages.

Other amphorae in coarser pale buff fabrics have combed semi-circles, wave patterns and undulations on their shoulders in the same position as the painted decoration on the North Syrian amphoras. B1 Dr83 (fig. 27.5) is an exceptionally complete example, although body sherds with similar decoration were relatively common. This decorative technique is found on sites around Resafa, where it is considered to be sixth- to early seventh-century. At Dibsi Faraj similar decoration on vessels of different forms was considered early Islamic.

c. Saqiya water jars. These form the largest recognisable group of pots excavated, with over 30 rims definitely falling into this category, and many more which perhaps belong in it. There are also about a dozen bases which seem to belong to the form. One complete example (fig. 27.4, B99 Dr134) was found in situ, embedded in a gap in the pavement (B84) in the entrance court to the bath building. It contained four Byzantine copper coins of the sixth-seventh century (on which see below) which provide a terminus post quem for the pot's use in this context. The general form consists of a wide mouthed jar which becomes slightly bulbous in the lower body, with a rounded base. Most have a well-defined lip around the rim, which curves under slightly, along with a distinctive button toe. They appear at Andarin in a range of contexts ranging from unstratified surface to levels immediately post-dating the abandonment of the baths, with a particular concentration in context B51 in the west section. They were produced in a small range of common coarse buff to orange fabrics. On their use and findspots see above.

The Coins.

Cyril Mango, Exeter College, Oxford

Seven Byzantine copper coins found in the bath were left for cleaning in the Damascus Museum. For now they can be only approximately identified.
1. Found in topsoil (B1); D 1.8 cm; illegible
2. Found in topsoil (B1); D 1.5 cm
   obverse: profile bust, inscribed ANVSPPAV
   reverse: wreath, inscribed E +
   5 nummi, sixth century
3. Found in west section (B55); D 1.5 cm; illegible
   size of 5 nummi
4-7. Found in east section, southwest corner, in saqiya jar (B99, fig. 27.4)
4-5. obverse: frontal bust,  
    reverse: inscribed M; one: ANNO  
    40 nummi pieces, sixth to early seventh century  
6-7. reverse: inscribed K  
    20 nummi pieces, sixth to early seventh century  
Concerning nos. 4-7, Prof. Michael Metcalf has confirmed that such coins would not  
have been in circulation or been otherwise available much after the early seventh  
century. He agrees with the suggestion that the coins were probably change intended  
for a bath attendant that somehow was overlooked in the long term. The paving stone  
may have been lifted in that (and other) corner(s) of the bath so that such jars could be  
set into the soil, to collect coins as tips. Alternatively, the coins may have been paid for  
admission to the bath: a contemporary Egyptian document gives the entrance fee to a  
bath as 20 nummi;\textsuperscript{38} thus the Anderin coins would have paid for six people.

The Inscriptions.
Cyril Mango, Exeter College, Oxford

\textbf{a.} Incomplete inscribed basalt lintel with central disc (B29, fig. 17)  
1.29 x 0.46 x 0.525 m; broken off at both ends; raised lettering H 6-8 mm.  
Found in 1997 reused as door jamb in \textit{qubbe} built over central north apse in the north  
section of the bath.  
The Anderin bath is identified as to function, donor (Thomas) and, consequently date,  
by this inscription which was published by Butler's expedition early in the century. The  
text as read by Prentice\textsuperscript{39} is as follows:  
+ This bath (\textit{loutron}), I, Thomas, (acting) again (\textit{au}) for the sake (\textit{charin}) of all, have  
given (\textit{dedoka}) to all property-holders [or labourers of the earth\textsuperscript{40}], presenting this  
remembrance.  
\textit{(disc)} + What is the name of the bath? Health (\textit{hygia}). Through this entering, Christ  
has opened for us the bath of healing (\textit{loutron iaseos}).  

\textbf{b.} Fragment of inscribed basalt lintel (fig. 18)  
0.50 x 0.48 x 0.46 m; raised lettering H 5-7 mm.  
An important discovery of the 1998 season was that of a second bath inscription which  
was found outside the west, main entrance of the \textit{kastron}. Unfortunately it is  
fragmentary, preserving only the right end of what was orginally a lintel carved with a  
\textit{tabula ansata}. Part of the text survives in four lines which read,  
\begin{verbatim}  
.... [L]OUTRON  
....[S]OTIRIAS  
........DEDOKE  
.........EIN  
\end{verbatim}  
Clearly this may be seen as a near formal pendant to the complete inscription a. The Raised  
lettering of both lintels is fairly common among contemporary inscriptions  
carved in basalt in this region. Nearly the entire text of the second inscription exists in  
the first: namely the bath is called a "\textit{loutron}," it was given "\textit{dedoka}," and, while the first  
inscription says that the name of the bath is \textit{Hygeia} ("\textit{to onoma tou loutrou, Hygeia}") the  
second text features the word \textit{Soteria} (Salvation), in this context comparable to "Health".
Both words appear prominently in contemporary epigraphic and literary texts connected with baths, as pointed out by Louis Robert.\textsuperscript{41} In the small country bath east of Antioch, at Toprak en Narjila, the floor mosaics feature personifications of \textit{Soteria} and \textit{Apolausis} (Enjoyment).\textsuperscript{42} On the question of the original positions of both Androna lintels, see above. The first bath inscription implies by the use of the word "again" (\textit{au}) that it was built after the \textit{kastron} (557-558); it could, of course, have been built after another (third) building of unknown date.

\textbf{Water Systems at Androna.}

Andrew Wilson, \textit{Magdalen College, Oxford}

The area where Androna is located, on the edge of the Syrian steppe at the margin of the pre-desert, receives between 250 and 300 mm average annual rainfall. Most rains come between October and April, with a peak in January; from May to September almost no rain falls. In such conditions careful water management was necessary to sustain a nucleated population of the size suggested by the ruins of Andarain. The problem of water supply at the site is further compounded by the relative isotropy of the terrain; the very gently undulating, almost flat, landscape lacks rivers or springs and offers no real possibility of tapping surface waters and leading them to the site. Androna's water supply in antiquity was therefore based on exploitation of groundwater resources and collection of rainwater.

\textbf{Water supply within Androna's walls.} The openings of numerous cisterns litter the site, and shallow depressions in the soil suggest the presence of many more which have collapsed. In all probability each house had its own cistern, situated under the courtyard\textsuperscript{43} and collecting rainwater from the yard and roof of the house. A cistern draw-hole surround is visible partly buried in the south part of the site near the South church; it takes the form of a square basalt block with a circular opening in the centre, and a shallow circular depression at each corner, linked to the central orifice by a groove (fig. 28).\textsuperscript{44} Presumably the cover sockets were intended to support the framework for a pulley mounted over the cistern's mouth, and the grooves may be for drainage to prevent water accumulating in the sockets and rotting the bases of the posts.

Some of the cisterns appear to be carafe-shaped,\textsuperscript{45} while others are evidently rectangular. Two well-preserved examples are visible in the northeast sector of the site, both roofed by flat slabs carried on arcaded walls. One, which has four bays divided by walls with a single arch (fig. 29) is probably that described by Butler, whose dimensions give a capacity of 330 m\textsuperscript{3};\textsuperscript{46} the other, whose capacity must surpass 240 m\textsuperscript{3}, had four (?) bays supported on walls each of two arches.\textsuperscript{47} The construction technique, known in the Roman and Early Byzantine Hauran in Syria, ultimately goes back to Hellenistic times.\textsuperscript{48} Both cisterns were originally lined with water-proof mortar; in the second cistern mentioned this took the form of a bedding plane of small gravel inclusions\textsuperscript{49} set in a light whitish yellow sandy mortar 1.8 cm thick, over which was applied a hard surface layer 3-6 mm thick, mid yellowish grey with whitish-yellow discolouration from water deposits. As far as can be ascertained from the surface remains, these seem to be domestic cisterns, but their capacities are large by the
standards of cisterns elsewhere - domestic cisterns in North Africa, for example, commonly had capacities of between 10 and 75 m³. The large sizes of the cisterns at Andarin may be explained by the absence of an aqueduct, necessitating almost total reliance on cistern water for all purposes, in contrast with, say, North Africa where the majority of settlements of any considerable size seem to have acquired an aqueduct.

In front of the narthex of the South Church (A.D. 528) is another large cistern, whose ribbed vaulting has collapsed (fig. 30). Butler gives the dimensions as 8.55 × 7.20 m; the depth was not ascertainable but was certainly considerably more than the present depth to fill of 2.5 m. Capacity was therefore substantially in excess of 340 m³. An inlet channel, cut in basalt blocks, runs diagonally into the cistern at the northeast corner, having apparently taken water from the church roof via a gutter at the northwest corner of the church.

Some of the depressions visible among the ruins of the site may represent wells rather than cisterns. One lies (apparently just outside the wall circuit) to the south of the South Church. It takes the form of a rectangular shaft measuring 3.25 m by 1.25 m, and 8.90 m deep (fig. 31), cut through the loose gravels and sandstone, and steined with basalt blocks where it is cut through particularly soft rock -- at the top for two courses, and again about halfway down for eight courses. The size of the shaft would be suitable for lifting gear such as a saqiya drive with a bucket-chain or pot-garland. An almost identical rectangular shaft, also steined in part with basalt blocks, is to be found to the rear of the main building at Qasr Ibn Wardan. The position of the well at Andarin, by the wall circuit, may suggest that it was used for irrigating land outside the walls; so too the well at Qasr Ibn Wardan, outside the buildings and on the side away from the entrance, but commanding land which gently slopes away to the north, seems to indicate a function of irrigation rather than alimentary supply. On the source of water supply for the Andarin baths, see above.

The extramural complexes - reservoirs and qanats. While Androna's location on the Chalcis-Palmyra route may have provided its raison d'être, its development into a settlement of some size required some kind of agricultural base to support both the local population and the caravan traffic passing through. (See M. Decker below.) Given the climate, such agriculture had to be irrigated, and this was achieved by means of reservoirs fed by qanats or foggaras. A qanat exploits an aquifer by means of an inclined underground gallery which drains water from within a hillside out to the point where the gallery emerges at the surface. It is characterised by numerous vertical shafts which provide access to the gallery during construction, and on the surface qanats are usually recognisable as a line of rings of spoil from digging the shafts (fig. 35). The technique seems to have originated in Persia during the first half of the first millennium B.C.

Butler recorded a square reservoir (or birkè) to the southeast of the site; Mouterde and Poidebard observe that it was supplied by a qanat, while Zakariyya adds brief detail on a second reservoir to the northwest. Both reservoirs were examined in 1998, their depths ascertained, and their supply channels traced. In addition, other qanats in the immediate vicinity and further afield set the Andarin systems in a wider regional context.
1. **The southeast reservoir and qanat.** To the southeast of Andarin lies a reservoir 61.3 m square, built in local sandy limestone (fig 32). Butler's drawing shows the architectural detailing still visible today, with niched recesses and a projecting cornice, but is evidently a somewhat idealised reconstruction. Particularly enigmatic is his statement that the reservoir is now 5 m deep, and was formerly perhaps 7 m deep; a test pit dug in the centre in 1998 encountered a chalky limestone layer, apparently the floor of the reservoir, 3.3 m below the edge of the coping, overlain by sandy earth. This gives a capacity of 12,400 m³, comparable to that of La Birké (11,500 m³). The inlet to the reservoir, situated on its northeast side, is a stone channel 1.42 m wide, covered with roughly dressed slabs; it forms the end of a qanat line. On the analogy of reservoirs such as that at La Birké discussed below, there was probably an outlet and distribution channels for irrigation on the west side. A possible small rectangular basin, c. 28 × 23 m, is indicated by vegetation and traces of walls to the south of the reservoir; a connection between the two is to be suspected, but no traces are visible on the surface.

Water for the reservoir was supplied by a qanat, heading towards it on a bearing of 162º, and visible for 1.4 km from the reservoir to the top of a slight ridge to the south-east. Mouterde and Poidebard suggest that the qanat originates at Sarqoutiyé, 20 km distant. Future fieldwork should clarify this point. The shafts are spaced c. 25 m apart centre-to-centre, and were some 0.80 m in diameter; they are much collapsed and their depth is not ascertainable. Nearer the reservoir itself the qanat channel must come close to the surface and emerge, but traces of the channel at ground level have been largely destroyed by recent ploughing for some 400 m before the reservoir. The alignment of the qanat would seem to take it past the reservoir, some metres to the north, and the inlet channel seems to have branched off the qanat at a bifurcation some 400 m from the reservoir (cf. the northwest reservoir, below).

Around the reservoir on the southeast and southwest sides are three artificial mounds (fig. 32), probably the spoil heaps from initial construction and subsequent clearing operations. Several basalt blocks (lintels?), some decorated with Christian motifs, lie immediately to the west of the reservoir, attesting activity here in the Byzantine period. To the northeast of the reservoir large quantities of slag and burnt ashy material were observed. The location of industrial/ manufacturing activity here, as at the northwest reservoir (below), is probably to be explained by the availability of water, e.g. for quenching. Further work is required to date this activity and to determine its nature. (See report on slag by C. Salter below.)

2. **The northwest reservoir and qanats.** A second reservoir, very similar to the first, lies to the northwest of Anderin (fig. 33) as reported by Zakariyya. This too is 61 m square, and a test pit in its centre established its depth as some 2.5 m deep, giving a capacity of c. 9300 m³. Like the southeast reservoir, it was built of local sandy limestone, and although it is not as well preserved, the manner in which several slabs have collapsed into the reservoir implies an overhanging coping at the top of the surrounding wall, and there is a suggestion of a cornice on the underside of some of these blocks. It was fed by a complex and extensive qanat system from the south. The
inlet channel\textsuperscript{61} which enters on the south side of the reservoir, is built of stone slabs (fig. 34). Shortly before the reservoir itself two blocks bear traces of opposed grooves for a sluice gate controlling flow in the main channel; a further cutting on another face of one of these blocks demonstrates the existence of another sluice gate on a derivation channel heading east.\textsuperscript{62}

As with the southeast reservoir, the inlet channel branches off the \textit{qanat} some distance upstream of the reservoir, while the main \textit{qanat} evidently continued past the reservoir to the east (fig. 36). A second derivation is visible on the branch heading for the reservoir. The \textit{qanat} system itself appears to be very extensive, with three main collecting tributaries in the upper reaches, and sections of the channel which have a double trace paralleling the modern track to Sammakiya on the way from Homeh to Andarin; the combined lengths of the various branches must exceed 10 km. The system seems to originate in the region to the southwest of Andarin. On the final stretch before reaching the reservoir, one of the shafts is steined with basalt blocks, and a little further downstream a wall in wedge-shaped basalt blocks revets a point where the channel appears to have been dug out and exposed to the surface (fig. 35). The purpose of this arrangement is unclear.

As at the southern reservoir, abundant scoria and waste from metalworking (?) were found. (See C. Salter below.) Those occur on the surface immediately to the east of the reservoir, between it and a building (possibly a courtyard farm) of Byzantine date, whose remains included extensive walls, a stone tank or vat, and inscribed and decorated blocks, all of basalt (fig. 33). Two converging \textit{qanats} visible either side of the modern road at Homeh, west of Andarin, seem to form part of a separate system coming from the spring at Ain Zarqa, some 20 km to the east of Andarin, and supplying a now-destroyed reservoir to the north. It appears that Andarin and its surrounding land formed the focal point of several extensive and complex \textit{qanat} systems, each many kms in length.

\textbf{Parallels to the reservoirs and \textit{qanats} at Andarin.}\textsuperscript{63} \textit{Qanats}, and \textit{qanat}-fed reservoirs, are fairly common in the desert margins of Syria,\textsuperscript{64} and seem in fact to have been the key to settlement in many parts of this arid region. Mouterde and Poidebard record a number of \textit{qanat}-fed reservoirs at sites of outpost forts along the \textit{limes},\textsuperscript{65} of which the closest parallels to those at Andarin are at Qnayé (70 m square), Qasr el-Her el-Gharbi, Qdeym, La Birké (67 m square), and 'Amsareddi. In most cases the reservoirs are visible largely as spoil heaps defining their outer limits, but traces of masonry walls are visible at Qasr el-Her, and the masonry is well preserved at La Birké (fig. 37), together with parts of the inlet channels. The reservoirs appear to have had a primarily agricultural function; the \textit{qanats} run past the settlement sites themselves to end some distance further on - some two kilometres away at 'Amsareddi, and a similar distance in the case of the northwest reservoir at Andarin. Evidence of outflow channels, doubtless for channel irrigation of fields, exists at La Birké and is probably indicated at the northwest reservoir of Andarin by a gap in the spoil mounds surrounding the reservoir, opposite the inflow (fig. 33). At La Birké parts of the network of distribution channels to land before the reservoir are still traceable,\textsuperscript{66} and
the derivation channels associated with both Andarin reservoirs also indicate irrigation of fields. The agricultural potential of these qanat-fed reservoirs is discussed in greater detail below by M. Decker.

**Date and function of the reservoirs and qanats at Andarin.** The construction of many kilometres of qanat channel, with shafts every few metres, was an enormous undertaking, and implies a significant population and the ability to mobilise considerable manpower. The date of these works, however, remains difficult to pin down with precision. The reservoirs cannot be earlier than the qanats, on which they depend. Given their similarities in size, construction material, and architectural styles, both reservoirs should be roughly contemporary. According to Butler, details of the architectural mouldings of the southeast reservoir point to a Roman rather than Byzantine date and Mouterde and Poidebard follow him in tentatively assigning it to the second century A.D. The stylistic grounds for this are vague, however, and other considerations concerning the date of the settlement of the site itself are important. Although the reservoirs were dependent on the qanats, we cannot yet demonstrate that they are exactly contemporary; the placement of both reservoirs at Andarin to the side of the main qanat line, fed by derivation channels, leaves open the possibility that they might be later additions.

**Agriculture at Androna.**

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The agricultural regime of Androna in antiquity would have been dependent on several factors, foremost of which are climate and soil conditions. Additionally, human intervention in the landscape probably meant the exploitation of underground water sources for use in irrigation, which would have greatly enhanced, in the short term at least, the agricultural potential of the region. (See above, Water Systems by A. Wilson.)

**Climate and soil.** Andarin is situated on the plateau between the Jebel Lattaqia and the North Palmyrides hills, an area of climatic and geological transition. Thus, Andarin lies at the edge of both the Mediterranean climate zone of the Syrian coastal-lands and the semi-desert belt that ranges across much of the central interior of Syria. This semi-desert belt gives way to desert further to the east, where ancient settlements such as Palmyra received only approximately 80 mm of rainfall or less per year and thus lay well beyond the limits where dry farming of cereal crops could be managed. In the region of the semi-desert steppe, most rainfall occurs between October and April followed by a long dry season. During the summer months, there is little or no rainfall, high temperatures, low humidity and little cloud cover. Moisture is lost quickly from such a landscape, a problem exacerbated by hot winds. Except in irrigated areas, one can expect cultivation to cease during this period. While Andarin receives by some estimates between 250 and 300 mm of rainfall per annum, this is concentrated in the winter months and tends to be erratic from year to year. The frequent lack of rainfall causes great fluctuations in crop yields. Grain crops such as wheat, the preferred bread grain of the Roman Empire, will yield well only once every three years under these conditions and 250-300 mm rainfall restricts cultivation of cereals primarily to barley, unless the crop is put under irrigation. In fact, barley
would have been the single dependable grain for the region if the inhabitants relied on a regime of dry farming only.

Andarin also lies in an area where soil types change from xeric to aridic. Xeric soils, generally characteristic of the Mediterranean area, are, as dictated by climate, moist and cool in winter, dry and hot in summer. Aridic soils are generally dry in all parts more than half of the year, with soil temperature (at a depth of 50 cm) above 5 degrees C. While these soils possess the warmth necessary for plant germination, the necessary moisture in the form of rainfall is often lacking which means plant growth is arrested. The xeric and aridic soils around Anderin are generally classified as gypsiorthid and/or calciothid. Gypsiorthid soils predominate in eastern Syria and have a high gypsum (calcium nitrate) content and are lacking in organic material. Calciothid soils are generally shallow and have a high calcium carbonate content, itself a limiting factor in agricultural potential. Future archaeological work at Andarin will focus on identifying the soils available to the farmers of antiquity so that patterns of exploitation through irrigation and fertilisation can be established. In appears that in antiquity the region immediately surrounding the site had a relatively low potential for settled agriculture based on traditional dry farming methods when compared with coastal and northwest Syria. This would suggest that the qanat lines and water reservoirs -- particularly that northwest of Andarin which lies too far to supply the site itself -- were used for crop irrigation.

Modern crops. In modern times, the area of Andarin has only relatively recently begun to be exploited for cultivated food production. There is some evidence of ploughing immediately around the site in the middle of this century, when Poidebard's aerial photographs were taken, but this exploitation was probably limited. As the population of Syria expands and more marginal areas are exploited, the semi-desert region of Andarin will likely continue to be pressed to furnish more foodstuffs. Today the region supports barley, cotton, figs and olives, with vegetable crops also grown. Significant areas lie fallow, probably to be put into use only once a year or every other year. As mentioned above, barley can grow under dry farming conditions without the need of supplementary water. By contrast, fruit crops, such as olives and figs, are grown under irrigation, as must be water-demanding crops such as vegetables and cotton to survive in the region, especially if they are double cropped throughout the summer months. This irrigation is carried out by means of motorised pumps on deep wells which tap groundwater, a method that provided the water for 214 000 hectares in 1977, 40% of the total of all irrigated lands in Syria in 1977, a figure which has been greatly exceeded today.

Olive oil and wine at Androna. Evidence of crop production in antiquity was found at two locations around Andarin during the 1998 season. Just outside the north walls of the site (and approximately 1 km southeast of the northwest reservoir) lie the remains of an ancient olive farm. The identification of the site as such is made possible by the survival of a basalt mill of mola olearia type, which remains in situ, in conjunction with large rollers (of a type common in northwest Syria) possibly used for extracting the oil, and associated cisterns which were required for refining the oil.
for consumption. A second *mola olearia* in basalt was found at Andarin near the origins of the *qanat* line which fed the northeast reservoir. These olive presses are a departure from the norm found elsewhere in the Levant, where they consist of a wooden beam and counterweight block or screw weight. The presence of olive mills just outside Andarin has implications for the scale of ancient agricultural production there, as mills are generally found in much smaller numbers than presses due to the nature of their construction: being relatively small and portable, they could be reused for milling or cooking purposes. These two finds probably point to a substantial olive oil production at Androna. The presence and construction of the olive processing installations are significant for a number of reasons. Olive presses probably reflect the potential to create a surplus production. Subsistence production of oil is possible without the expense of such installations. Additionally, the presses at Andarin are in a geographical setting far east of what is considered to be the line of olive cultivation. Olives require limited temperature fluctuations and a reasonable amount of rainfall, and have always been identified as a quintessential Mediterranean climate adjusted plant.

The possibility of irrigated olive farms is even more likely when one considers that Androna was known as a centre of wine production. Both wine and oil would have provided a cash crop to local producers that would have justified the capital investment required to maintain the irrigation regime of the region. Vines, while possessing some drought-tolerant characteristics, require water at key stages in their development and may benefit from irrigation. While no remains of wine presses have been found thus far at Andarin, it is possible that they lie buried in the vicinity of the site or in the outlying villages. Vine scrolls feature prominently on the architectural sculpture at the site, and while the climate is not ideal for vines, the soil and water conditions do not exclude their production. Indeed, the calcium content of the soil could lend itself well to vine cultivation, and we know of vines cultivated in the southern areas of the Levant, in semi-arid and arid conditions, that produced some of the finest wines of Late Antiquity. Wine production at Androna in sufficient quantity for export to Arab tribes of the interior, as stated in the pre-Islamic written sources (see above), is therefore well within the climatic limits of the area as regards soil and temperature. If the local rainfall was supplemented by artificial means, this becomes an even more likely possibility.

**Pastoralism.** Pastoralism probably also played a large part in the economy of Androna. Today the region’s wide-scale crop farming requires the additional, artificial support of pastoralism; the same must have been true in antiquity. The primary livestock upon which the local economy depends now is the Awassi, or fat-tailed sheep, a dual purpose breed, providing both fine wool and milk. This breed could have been found in the region in antiquity, as well. Awassi are nobly suited for the harsh environment of the Syrian steppe: they are naturally hardy and tolerant of the varied conditions of the desert. As the pre-desert steppe stretches to true desert in the east, the activity of semi-nomadic groups was inextricably intertwined with that of the settled inhabitants. In future seasons at Andarin we shall attempt to enhance our understanding of the role of these ties and of the exploitation of livestock on the site.
Industry at Androna: pyro-ceramic material.

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The material examined and reported on below came from two different areas at Andarin. The sample (OX 4080) from context B136 of the bath consisted of a small "slag" cake of the type usually designated as a smithing hearth bottom (SHB). This sample was unusual in that, although having the form of a SHB it was composed mainly of metallic iron. Slag usually predominates in smithing hearth bottoms, with metallic iron only making a minor contribution to the total volume. However, when the metal is initially removed from the smelting furnace, it may have a structure similar to that seen here. This structure suggests that there is a slight possibility that this was the result of either iron-smelting, or more likely the working of raw blooms into useable metal.

Other material gathered by the southeast reservoir included a piece of vitrified clay from a hearth-lining (OX 4083), a flow of melted hearth lining (OX 4084), two pieces of slag-like material which were probably formed by the reaction of fuel ash with the surrounding hearth lining materials at high temperatures (OX 4087, 4086). There were two pieces of what appear to be basalt that has been used as hearth lining, and they have been heated to the point where the surface has been vitrified (OX 4082) or melted (OX 4085). This would suggest that there was a basalt-lined furnace in the area, or more likely that the furnace was constructed of basalt and then the interior was covered with a clay surface. This furnace had been run at high temperature for a sufficient time for the clay lining to have been worn away, allowing the basalt to be attacked by the heat. Given the temperatures and length of times that must have been involved, it is likely that such a furnace was associated with metal or glass working.
NOTES

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H.C. Butler, 1920, pp. 47-63; R. Mouterde and A. Poidebard, 1945, pp. 67 f., 174, 217, pls. CX-CXIII.

`Amr Ibn Kouloum, Mo`allaq, I; see note 78 below.

On an Antioch-Palmyra route in the late-3rd-century (?) Antonine Itinerary; R. Mouterde and A. Poidebard, 1945, pp. 6 f.; on Androna on this route see pp. 62 f., 174.


Yakut, Geographical Lexicon, i.373 (1225) wrote that Andarin was "a village that existed formerly to the south of Halab now in ruins"; cited in G. LeStrange, 1890 (1965), 394.

See, C. Strube, forthcoming. Other noted monuments include two sets of circuit walls, a hypostyle building ("praetorium") and a dozen churches. At least 50 Greek inscriptions -- all of Early Byzantine date -- are known. Names given: a mix of Greek, Latin, Biblical and Arab; H.C. Butler, 1920, pp. 47-63; W.K. Prentice, 1922, pp. 43-60.


G. Mazor and R. Bar-Nathan, 1998, pp. 18-20, fig. 16.

One could add that the polygonal face of the central apse on the north is a characteristic feature of churches instantaneous.

The type was identified by Michael Decker. See discussion below.


T. Schioler, 1973, 97; J.P. Oleson, 1984, figs. 5-6.


H.C. Butler, 1920, 48.

G. Charpentier, 1994, pp. 113-142.

See, for example, the sculpture from the cathedral of Seleucia Pieria; K. Weitzmann, 1941, pp. 135 ff.


We applied a preservative solution to the surface of the frescoes and consolidated the edges with lime plaster. A breeze-block wall was built in front of the frescoes and the intervening space filled with Nebki sand.

On the Temple of Bel frescoes see J. Leroy, 1965, pp. 17-20, pl. s I-II; on Piazza Armerina see A. Carandini, A. Ricci, A. rs, 1982, p. 90, fig. 200; on Qusayr Amra see Musil, 1907.


The pottery of this transitional period is discussed in summary form by J.-P. Sodini et al., 1992, pp. 195-218.

I am grateful to John Hayes for examining and commenting on much of this material. Form references are to J.W. Hay 72 and 1980.

J.-P. Sodini et al., 1980, p. 258, fig. 320.

M. Mackensen, 1984, pp. 54-55.

For example, at Déhès: D. Orssaud, 1992, fig. B, no. 8 as a comparison for And B1 Dr71.

J.-P. Sodini et al., 1980, pp. 246, 248 type 3 (neckless); 246, type 5 (high necked).


J.-P. Sodini et al., 1992, pp. 199-201, figs. 4-5.

John Hayes says that the fabric does not appear to be that in which this form was produced on Cyprus, and thus it may the Syrian/Cilician production identified by J.-Y. Empereur and M. Picon, 1989, pp. 236-243.


M. Mackensen, 1984, p. 53 and pl. 15.8; 15.17; 18.12; 27.20; 30.13; 30.14.


W.K. Prentice, 1920, p. 48 no. 918.

. L. Robert, 1948, pp. 77-86.


. As suggested by H.C. Butler, 1920, p. 48.

. Sockets 0.18 m in diameter and 0.02 m deep; grooves 0.02 m wide. A stone of the same pattern still covers the mouth of a cistern at Homel, a little to the west of Andarin.

. Like examples at Déhès and Behyo in the limestone massif; J.-P. Sodini et al., 1980, p. 224; G. Tchalenko, 1953-1958, cxviii.

. H.C. Butler, 1920, p. 48 gives measurements of $10 \times 5.5 \times 6$ m deep; our measurements were $10.4$ (estimated) $\times 5.4$ m deep to fill.

. Dimensions: $10.92 \times 7.56 \times 2.67$ m deep to fill at spring of arch. The cistern may have been 2 or 3 m deeper below the ring of the arch.

. H.C. Butler, 1919, p. 343. It is found in the theatre cistern on Delos; T. Homolle, 1894, pp. 161-168.

. 2-5 mm across.

. A.I. Wilson, 1997, p. 54.


. See J.P. Oleson, 1984, pp. 360-4 for the remains of bucket-chain or pot-garland installations which include rectangular wells of comparable size; a well of similar dimensions, which may also have employed lifting gear, is also to be seen in the Square Cisterns at Ptolemais in Libya; see A.I. Wilson, 1997, p. 47.

. This well seems to have been overlooked by both Butler (H.C. Butler, 1920) and Poidebard (R. Mouterde and Poidebard, 1945) and is not marked on either of their plans.


. H.C. Butler, 1920, p. 63; ill. 63.


. Sample dimensions: $1.20 \times 0.59 \times 0.34$ m; $1.20 \times 0.56 \times 0.30$ m.

. 0.50 m wide and at least 0.40 m deep.

. Cf. La Birké, R. Mouterde and A. Poidebard, 1945, plan V.

. We wish to thank Dr. A. Zaqzuq for his permission and assistance in visiting these sites published by Mouterde and Poidebard.


. For these soil types and discussion, see C. Akruf, 1980, pp. 29, 48-49, 61.

. R. Mouterde and A. Poidebard, 1945, pl. CXI.


. For a description of this type, see R. Frankel, S. Avitsur, E. Ayalon, 1994, pp. 31f.

. For reconstruction of the installation at Behyo see G. Tchalenko, 1953, pl. CXIX. Rollers might have been used for milling or pressing the olives.


. R. Mouterde and A. Poidebard, 1945, p. 15 note 1 citing `Amr Ibn Koultoum, Mo`allaqa; see also E. Honigmann, `Syria'

. uyl Wissova, col. 1562-5.

. Expositio Totius Mundi, on which see P. Mayerson, 1962, and for the identification of Gaza wine with this region.

. For a complete discussion on the Awassi, and a brief discussion as to its antiquity, see M.L. Ryder, 1983, pp. 228 ff.

. These small cakes of slag have been called smithing hearth bottoms, or hearth bottoms in the literature after G. McDonn

. 83, 81-83, however, the term is inappropriate as it assumes modes of origin that are not necessarily those that produced t

. 83, 81-83, however, the term is inappropriate as it assumes modes of origin that are not necessarily those that produced t
If the iron smelting was local, there should be relatively large quantities of slag present.