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## 10 Mortar and plaster *by Naomi Crowley*

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### 10.1 Methodology

Samples of mortar were collected by hand from selected features on site and the majority of the bulk sediment samples also produced fragments of mortar. The assemblage was examined using a binocular microscope, at a magnification of  $\times 20$ , to identify the different types of mortar or plaster present. From this, samples were selected for further analysis by removal of the lime-based fraction. This involves dissolving a cleaned, dried and weighed sample in 10% hydrochloric acid to remove the lime binder. The percentage of lime to aggregate can be calculated and the size distribution and geological nature and source of the aggregate determined. The results allow comparison between different mortars and their distribution on site.

### 10.2 Microscope examination

Initial examination by microscope identified three types of mortar and a clay. These are described below. From these, five samples (renamed AOC/1–5) were chosen for further analysis.

*Type 1* Samples of plaster from walls of room 4 (Period II). Plaster consisting of two layers. The backing layer varies in thickness from 13 mm to 15 mm and is a light pink-brown colour with frequent aggregate, moderate lime ball inclusions, occasional shell fragments, mica and voids. The surface layer is slightly uneven, varying from  $< 1$  mm to 2 mm and consists of a white limewash. The backing mortar from each sample was selected for further analysis and assigned new sample numbers AOC/3 and AOC/4 respectively.

*Type 2* Sample of rendering from blocking of archway (context 136, Period V), and other material, mostly from bulk samples. Off-white coloured mortar with frequent aggregate, occasionally up to 10 mm, moderate voids, occasional shell fragments and lime ball inclusions. The sample from the blocking of the archway contains very occasional fine orange hairs.

*Type 3* Hard greyish brown coloured mortar with frequent aggregate and occasional burnt coal. Possibly cementitious. From context 099, midden deposit, Period IV–V.

*Type 4* Light orange coloured fine grained clay with impressions of fine organic matter, from room 6 (Period IV). This was selected for further analysis and assigned the sample number AOC 1.

### 10.3 Analysis by removal of lime

Samples AOC/2–5 all contain shell fragments in the aggregate. As shell dissolves in hydrochloric acid, the percentage in each sample was estimated before the sample was dissolved and this figure incorporated into the results.

*AOC/1* This Type 4 clay sample was dissolved in hydrochloric acid to determine if it was a clay mortar containing lime. There was no significant reaction and so it is concluded that the sample contained no lime.

*AOC/2–5* The analysis of these samples confirms the initial identification of the two mortar types. The grain size distribution graphs for AOC/3 & 4 (both Type 1) showed a strong similarity. Both are a lime-rich plaster containing a fine aggregate. AOC/2 & 5 (both Type 2) have similar size distribution curves, but are different to AOC/3 & 4, with coarser aggregate. The aggregate in all the samples consists of grains of sandstone, schist and granite in the coarser fractions with mainly quartz, mica and other minerals degraded from the different rock types in the finer fractions. The geology suggests a local source and the presence of shell indicates that the aggregate is a beach sand.

### 10.4 Discussion

The examination of the mortar samples suggests that throughout the different phases of building the same source of local sand was used for the mortars and plasters. Type 1, a fairly fine plaster, was used in room 4 in Period II and covered with a white limewash. Fragments of this also occur in the fill of the construction trench for the blocking of the archway in that room in Period V (see 4.6.2 Room 4 & 6). The rendering used on the blocking of this archway in Period V (context 136) consists of a coarser whiter mortar, Type 2. Fragments from most of the bulk sediment samples, ranging in date from Period I to Period V, resemble this type. It is difficult to determine whether this apparent chronological spread is due to continuity in use of material sources through time or to complex processes of deposition and disturbance. A small cementitious Type 3 fragment from Period V, is probably 19th/20th-century in date. The Type 4 material, which is a clay rather than a clay lime mortar, derives from room 6 in Period IV (see 4.5.3 Room 6).