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Summary

Four glass beads were analysed semi-quantitatively by XRF. Two of the miscellaneous finds were shown to be sealing wax. This report supersedes AML Report No 4575.

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GLASS BEADS AND MISCELLANEOUS FINDS FROM BEESTON CASTLE, CHESHIRE

Four glass beads (AML Nos 844357, 865430-32) and three miscellaneous samples (AML Nos 865076, 865079-80) were examined and analysed qualitatively or semi-quantitatively by energy dispersive X-ray fluorescence (XRF). AM 865076 appeared to be a natural fossil of no archaeological significance.

Both AM 865079 and AM 865080 had high levels of mercury detectable; sulphur was the only other element present in more than trace amounts. This suggests the colour of the pieces was due to the presence of mercury sulphide. This bright red pigment occurs naturally as the mineral cinnabar but was also made by heating mercury and sulphur together when it is called vermilion. These pieces cannot be pure vermilion as it has a density of 8.2 gm/cc and they are far lighter; the pigment must be mixed with an organic material which cannot be detected by XRF. When touched by a hot pin the pieces softened locally and gave off a smell similar to that of sealing wax - which is probably what they are. AM 865079 is the end part of an extruded rod just over 1cm in diameter; its paler colour of is due to a weathered surface which has been acquired during burial as it covers both original and fracture surfaces. Both pieces came from 17th century contexts.

The glass beads

The XRF analyses of the beads do not give any indications of the bulk composition of the glass but do show which elements have been added to it to produce the colour and/or opacity seen. So that comparisons can be made between the four beads here and also with beads from other sites the individual XRF peak heights have been normalised by dividing each by the silicon peak height for the same bead. This allows for differences of size and shape in the beads as the silicon content of all ancient glass is approximately constant.

Table: XRF peak heights normalised to silicon

AML No	844357	865432		865431	865430
Colour	blue	blue	blue/white	turquoise	black
Ti	.01	.04	.06	.04	.04
Mn	.08	-	-	.07	1.07
Fe	.23	.54	.59	.21	.13
Co	+	+	+	-	-
Cu	.09	.19	.20	.44	-
Zn	-	?	-	-	-
Pb	-	.05	.06	-	.05
Sn	-	-	-	-	-
Sb	-	-	.05	-	-

Key: + = detected ? = uncertain - = not detected

The blue and white bead (AM 865432) is a prehistoric type. The applied spiral trails of opaque white glass have been marverred into the surface of the transparent blue glass. The area of white glass is too small for it to be isolated for analysis; the best that can be done is to analyse a mixed blue and white area. The blue colour is produced by cobalt and the opaque white is due to the presence of crystalline calcium antimonate. Antimony is the common opacifier in prehistoric and Roman glass so it is to be expected here.

The plain blue bead (AM 844357) is of a slightly brighter, more luminous hue; its colour is again due to the presence of cobalt. The glass is transparent but appears only translucent as it contains many tiny bubbles and a few opaque particles which are probably unreacted raw materials from the manufacture of the glass. The bead is poorly formed and this together with its inclusions and composition suggest it is most likely to be medieval or later. Very few Saxon or earlier beads have so many of the diagnostic elements below the level of detection (see Table) and the figures for those elements that were detectable are also lower than normal for ancient glass.

Although turquoise colours due to the presence of copper are known from prehistoric times onwards, AM 865431 is probably medieval or later as the glass again lacks the traces of many elements which are characteristic of ancient glass. The black bead (AM 865430) is another example of this but here the colour is a further indicator of a late date; very high levels of manganese, which are responsible for the colour seen, are not found in earlier glass although more moderate amounts, which produce purple and golden brown colours, are known.

The dating for the beads that can be suggested on the basis of their composition is not always in agreement with the date of the context in which they were found. A third date may be suggested on the basis of typological study (to be done by Peggy Guido) and any final conclusions should await that report. Beads are small objects that can move easily within the soil so finding them in a context of different date to that of their manufacture is not totally unexpected.