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Ancient Monuments Laboratory
Report 40/92

THE IDENTIFICATION OF TWO GREEN STONES FROM ST MARK'S CHURCH, LINCOLN

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Summary

Two green stones were found to be emerald. Pearly/glittery white ends proved to be an optical effect caused by growth features, rather than by crystals of a different mineral or a lack of the colourant.

Author's address :-

Mrs M E Hutchinson

29 Elliscombe Road
Charlton
LONDON
SE7 7PF

THE IDENTIFICATION OF TWO GREEN STONES FROM ST MARK'S CHURCH, LINCOLN

M E Hutchinson FGA, DGA

Two green and white stones were submitted for identification. One seemed to be a natural crystal, a hexagonal prism, the other a cut stone. Both were remarkable in appearance as in each case the sides of the stones were green but the ends were white and glittery. In the case of SM 76, (ANG) /ST46\ AML 910223, the centre of the stone appears to be white as well.

The stones were examined by low-powered optical microscopy, energy dispersive X-ray fluorescence spectroscopy (ED-XRF), and scanning electron microscope (SEM). Both the green and the white areas were analysed, but no difference in composition could be found. As it had been said recently by an American gemmologist (Dr Giraud V Foster, pers comm) that Roman emeralds (which these stones resemble) were full of acicular crystals of actinolite, and it was to these that they owed their characteristic fibrous appearance, and because actinolite does occur in crystals of the beryl family, permission was sought and gained to take a sample. This sample was analysed by X-ray diffraction, (XRD) and found to be beryl coloured green by chromium, ie, emerald. If actinolite is present, there is very little; the fibrous structure is therefore a growth feature, as had previously been supposed and the glittery/pearly ends a purely optical effect. This effect, known as 'schiller', is common on emeralds of the Roman period which have a flat surface perpendicular to the 'c' axis of the original crystal. Emerald is the green variety of beryl, coloured principally by chromium though vanadium may be present as well.

SM 76, (AYF) /St45\ AML 910222

This stone was found with fourth century AD coins in a mid-tenth century dump on the graveyard area. Most of the objects found in the fill were Roman.

Length: 6.5mm

Maximum width across points: 9.9mm

Weight: 0.9952g, 4.97 metric carats

Cut: left as a natural crystal, but with a hole bored down the long axis for use as a bead.

Identification: beryl, variety emerald

SM 76, (ANG) /ST46\ AML 910223

This stone was found in the fill of a mid 11th - mid 16th century mortared cist, inhumation 358, the lid of which was missing.

Length: c9.6mm

Maximum width: 14.4mm

Weight: 1.7446g, 8.72 metric carats

Weight of sample removed: 0.0067g, 0.034 metric carats

Cut: it looks as though a crystal, shaped as above, has been cut in half, parallel to the sides of the prism. The corners and the edges, top and bottom, have then been rounded off.

Identification: beryl, variety, emerald.

From their appearance, these two emeralds would seem to be Roman. Pierced emerald crystals are well known from Roman sites, eg London (Hobley 1986), and the unpierced stone is similar to one excavated at Gorhambury, though much smaller. It is usually supposed that the Romans obtained their emeralds from the Egyptian emerald mines, now disused, and they certainly do not resemble stones from areas currently being mined, though there is some resemblance to Siberian material. Pliny (Pliny 1971) lists several sources for 'smaragdi', and although some of the minerals he describes are clearly not emeralds, others may be. Research is being undertaken to try and identify the sources of emeralds used in the classical world.

Acknowledgements

I am indebted to Jon Webb, Ancient Monuments Laboratory, for the SEM, ED-XRF, and XRD analyses.

References

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