

Ancient Monuments Laboratory Report No. 4673

Analysis of a Rock Sample from Landguard Fort, Felixstowe

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The sample analysed consisted of a single lump of green rock from the moat of Landguard Fort. It was suggested that cannon from the fort had been buried in the moat and that the colour of the rock might be due to the presence of copper. The sample was therefore analysed elementally using energy dispersive X-ray fluorescence (X.R.F.). A small area of the sample was a bright red colour and this area and three samples from the bulk of the rock were analysed using X-ray diffraction (X.R.D.) to determine the major compounds present.

The major element detected by X.R.F. was barium, and iron, lead, calcium and strontium were also present at significant levels. No copper was detected.

X.R.D. of the bulk material showed that it was essentially barium sulphate (barytes, $BaSO_4$). The red material was mercury sulphide (HgS), which is generally known as cinnabar or vermilion.

The colour of the bulk material was clearly not due to copper, which was not present at detectable levels, and the sample does not provide any evidence for the presence of cannon in the moat. Barytes occurs in several areas of England, particularly in the North, but, although it can be found in a range of colours, it would not normally be expected to be the colour of the rock from the moat. The colour of the rock is therefore probably due to contamination, perhaps by iron.

The rock could be of geological origin, but the presence of vermillion, which is usually found used as a pigment, suggests that the green material may also have been intended to be used as a pigment. It retains its colour on grinding to a powder and would therefore be suitable for such a use. If the material was a pigment, it might have been deliberately coloured although it is not possible to be certain of this on the evidence available.

A similar sample of barytes was found at Bishopgate, Norwich but again there was no associated archaeological evidence to indicate whether it was significant. The Norwich sample was coloured blue, and may also have been a pigment but no vermillion was found on it.