Ancient Monuments Laboratory
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INVESTIGATION OF SOIL SAMPLES FROM BEVERLEY EASTGATE (BE84), HUMBERSIDE FOR EVIDENCE OF TEXTILE PROCESSING.

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Summary

Analysis of a series of soil samples from a suspected dyeing area yielded evidence of both dyeing and fulling.

Author's address :-

Department of Physical Sciences
North East London Polytechnic
Romford Road
STRATFORD
E15 4LZ

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Ten soil samples (AM 871289-98) were submitted for investigation. The analysis was carried out in two stages. Stage 1 involved attempts to isolate recognisable dyes. Stage 2 involved the attempted isolation of organic substances that reflected degenerate textile or textile processing such as fulling.

Stage 1

10g portions of the sample were gently crushed and extracted with various solvents. Initially, dilute acids were employed but no dye substances were isolated. Subsequently a range of organic solvents were employed, including methanol, pyridine and ethyl acetate. Again no positive results were obtained. Finally, solutions (in various solvents) of the complexing agent EDTA were employed and traces of madder were isolated from 871289. No other sample gave positive results.

Each extract was concentrated under reduced pressure and then investigated by both spectroscopy and chromatography. Although traces of humic substances were detected in all samples, only 871289 gave a positive dye identification.

Stage 2

All samples were microscopically examined but no textile residues were observed. Most appeared to be clay systems with inclusions of small amounts of calcium carbonate. Additionally 871289 contained fragments of charcoal.

A (second) 10g portion of crushed sample was subjected to soxhlet extraction with the solvents hexane, chloroform, propanol and water, in ascending order of polarity. Each extract was concentrated and investigated by infrared spectroscopy and various chromatographic techniques. Sample 871297 gave positive results for wool fat; 871291, 871294 and 871295 contained traces of adipocere, a degenerate fat/oil.

Finally 2g samples were subjected to reflux with 6M hydrochloric acid for 24 hours in order to hydrolyse any proteinaceous material present such as partially degraded wool. Although traces of amino-acids (the hydrolysis products of proteins) were detected, none were present in sufficient quantity to assign a definite origin.

The yellowish appearance of 871295 suggested a cess deposit. Phosphate analysis showed this sample to be over 20 times richer in phosphate than the other samples. Additionally it gave a weak positive uric acid test. All other samples gave negative results. It seems reasonable, therefore, to suppose 871295 was associated with cess (urine). The presence of urine would be in keeping with textile processing as it could have been used either as a detergent or as an agent to dissolve acid dyes to obtain a more suitable dyeing solution.

Conclusion

The chemical evidence suggests that textile processing had taken place on the site, certainly fulling and probably dyeing.

J Evans
Dept of Physical Sciences
North East London Polytechnic