ANCIENT MONUMENTS LABORATORY

REPORT

1505

SERIES/No	TECHNOLOGY
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TITLE	Report on the "crystalline substance" from Chelmsford, Site T.

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A.M. No. 731953

Excavator's Remarks "Crystalline substance, apparently once forming a tall vessel. Impossible to lift. Samples only taken of material. Associated with group of jet objects. Is it glass?- or a natural material of the "Blue John" type.

Appearance White-grey material ranging from apparently crystalline particles of c. 2mm. diameter down to a fine powder. However, microscopical examination revealed no definite crystalline form and it is thought more likely that the appearance of the powder was a result of small-scale fracturing processes. The larger particles which were easily crushed , had surface crusts of similar appearance to those found weathered onto ancient glasses.

Tests a) Silicate by NaF/H_2SO_4/Hanging water droplet Test.

A vigorous effervescence of Hydrofluosilicic acid vapour occurred, a white deposit of silica being formed in the hanging water droplet ; i.e. Test positive.

Therefore Silicate present.

b) Fluoride by SiO_2/ H_2SO_4/ Hanging water droplet Test.

A positive reaction (identical in nature to that described above) did not occur; i.e. Test negative.

Therefore, No Fluoride detected.

c) Sulphate by $BaCl_2$/HCl test on Na_2CO_3 extract of solid.

No precipitate of barium sulphate was formed. A control experiment using authentic Alabaster ($CaSO_4$) gave a positive result.

Therefore, No Sulphate detected.

d) Hardness Test.

The material did not scratch a glass slide of hardness 6 (Feldspar) on the Moh scale . A similar test on clear polystyrene showed its hardness to be greater than 2 (gypsum).

e) Density.

The density of the material was less than that of bromoform (2.63-2.69g. per ml.) and greater than that of carbon tetrachloride (1.59 g. per ml.)

For comparison, density of Fluorspar= 3.25 g.per ml.

density of glasses = c.2.2-2.6 g. per ml.

f) Qualitative Analysis via the "Milliprobe".

With the exception of a very weak signal due to copper, no elements were detected. Specifically, the elements lead, silver, gold, zinc, iron, arsenic and mercury were not detected. The elements calcium and potassium, only detected with difficulty by the instrument,were not in fact sought in this analysis.

Conclusions From the negative test for sulphate (c) and the fact that the test material has a greater hardness than Gypsum, it appears that the sample does not consist of Alabaster, i.e. ornamental grade Gypsum, $CaSO_4.2H_2O$. Similarly, the negative test for Fluoride (b), coupled with the low density of the test sample as compared to authentic Fluorspar, suggests that it is not composed of "Blue John", an ornamental grade of Fluorspar,CaF_2. Finally, the appearance of the sample, coupled with the positive test for Silicate suggests strongly that the sample does in fact consist of weathered (and possibly devitrified?) glass.

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