

Dr D.W.Von Endt,
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13th April, 1978.

Dear Dr Von Endt,

Peter Robins, Professor of Chemistry here, expressed interest in the contents of this famous phial and I let him see your manuscript. He has commented on what you have written; I enclose his remarks in case you in turn would wish to comment on them. I would say that it seems to me very unlikely that the protein in the phial was a subsequent introduction (first para). I spoke to Robins about this and he talked about worms getting into it. I don't know what he means by musk plant - I didn't notice this yesterday when he brought his comments, having just arrived from England, and now he has gone for a sabbatical. The rest is more in your province than mine.

Yours sincerely,



Neville Chittick
Director

Comment on a Report entitled "Amino Acid Analysis of the Contents of a (Coptic) Vial Excavated at Axum" by D.W. Von Endt of the Smithsonian Institution.

The method of analysis described is perfectly valid and can be taken as evidence of a small quantity of protein-containing material in the vial - but since the vial was broken when found (p.9 "-the bottom half of a glass vial-) there is no possible way of ensuring that the protein is connected with the original contents of the vial and is not a subsequent introduction.

The amino acids detected indicate approx 4% protein in the calcareous content of the deposit, and the types of amino-acid indicate that collagen (and keratin) was present. This is found in skin/hair and in bone, and a calcareous concretion containing collagen would make one suspect bone rather than skin/hair as a possible origin.

Hair contains large quantities of the amino acid cysteine (Nos 9 on the charts) and these can be seen as fairly prominent peaks in the Axum sample and the hair (but not skin) of modern civet. However, ~~they are~~^{it is} not specific to civet, but ~~is~~^{is} generally present in all mammalian hair.

Civet gland secretion does contain some specific large ring ketones (compounds responsible for its use in scent preparations) which are not found to occur in other species, though similar materials occur in beaver scent gland and in the musk plant, and a chemical detection of these would be far more specific as a proof that the vial had contained a civet-based scent.

In my view the presence of small quantities of protein cannot be used as valid evidence of any original content of the vial, since almost any animal matter, either originally in the vial, or introduced after it was broken, could have provided the collagen/keratin detected.

P.A. Robins

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