AN ORGANIC DEPOSIT FROM THE TOTTANFJELLA, DRONNING MAUD LAND

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Two specimens, which were collected by D. A. Ardus (1964) in November 1961 from the south-western part of the Tottanfjella, were submitted for chemical analysis, since there was considerable doubt as to their chemical composition and origin. A number of chemical tests, which are described in detail below, have now been carried out on these samples, and the results obtained indicate that their composition is consistent with some form of bird excretion. Analysis has shown that these deposits are composed mainly of lipoids, with smaller amounts of uric acid, rock fragments, inorganic material which is possibly calcium phosphate, and other unidentified substances. The rock fragments found in these deposits vary from 1 mm. to 1 cm. in size and they appear to have been derived directly from the substratum.

When a sample was heated, it melted, charred and burnt with a smoky flame, and when the carbon was removed a considerable amount of a white inorganic ash remained. Thus, the substance appeared to be partly organic and partly inorganic.

Petroleum ether (40–60°) was added to a 300 mg. sample. The solid was broken up mechanically, the solution centrifuged and the remaining solid was re-extracted with petroleum ether. The two petroleum ether extracts were combined and taken to dryness to give a residue (35 mg.). The solid, insoluble in petroleum ether, remaining from this extraction was extracted three times with acetone, and the acetone solution taken to dryness to give a residue (135 mg.). The solid remaining after this extraction was added to 5 ml. of *N*-NaOH when most of it dissolved, apart from a few rock fragments and a small white precipitate, possibly calcium phosphate (21 mg.). The ultra-violet absorption spectrum of the alkaline solution was identical to that of uric acid (amount present 35 mg.). The solution was chromatographed in isopropyl alcohol : water : NH_3 (70 : 30 : 6) and in 5 per cent Na_2HPO_4 : isoamyl alcohol on Whatman No. 52 paper, with urea and uric acid used as standards. The presence of uric acid in the solution was confirmed, since an ultra-violet adsorbing component having the same retention factor (R_F) value (0·10 and 0·30, respectively) in both solvents as the uric acid marker was found. Also, the ultra-violet spectrum of the spot when eluted had the following characteristics (the uric acid standard is given in parentheses):

	pH 1	pH 13
250/260 mμ	1·05 (1·05)	1·5 (1·5)
280/260 mμ	2·60 (2·86)	2·3 (2·4)
$\lambda_{max.}$	230 mμ (231 mμ) 284 mμ (283 mμ)	294 mμ (292 mμ)
$\lambda_{min.}$	256 mμ (255 mμ)	263 mμ (260 mμ)

The spot also gave a mauve colour when sprayed with ninhydrin reagent, as did the standard uric acid spot.

One other ultra-violet fluorescent and adsorbing spot was detected on the chromatograms but it was not present in sufficient quantity to enable its spectrum to be taken. It was highly water soluble, having R_F values of 0·0 and 1·0, respectively, in the two solvent systems.

Apart from the presence of inorganic material, no other components were detected on the chromatograms of the alkaline solution. Negative results were obtained for guanine, guanidine, urea and amino acids, when viewed in ultra-violet light, and sprayed with silver nitrate or ninhydrin. The deposit, therefore, has the following composition: lipoids (material soluble in either petroleum ether or acetone), 57 per cent; uric acid, 12 per cent; rock and inorganic material, 7 per cent; unidentified material, 24 per cent.

The chemical composition of this deposit is therefore consistent with that of an excretion of some form of animal or bird life.

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ACKNOWLEDGEMENT

The authors thank Professor M. Stacey, F.R.S., Mason Professor and Head of the Department of Chemistry, for his interest in this work.

MS. received 29 January 1964

REFERENCE

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