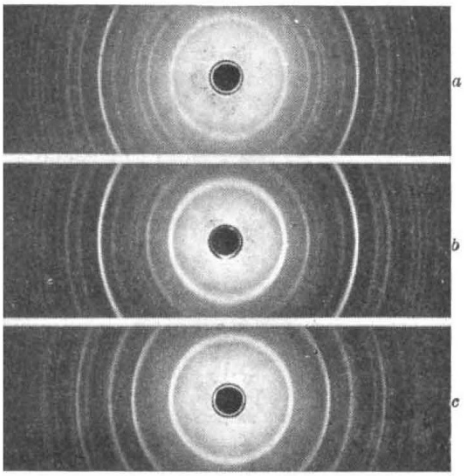
Identification of a Calculus from a Hippopotamus

DURING a recent visit to Nairobi, one of us (K. P. O.) secured, for purposes of determination, a fragment of a brown calculus of rather unusual origin which is preserved in the Kenya Game Department. Captain A. T. A. Ritchie, chief game warden, said that according to report this 'stone' was found in a hippopotamus killed on the Tana River some years ago. It was cut out of the animal by a native skinner, whose employer had passed it to Captain Ritchie. The location of the calculus in the animal was not recorded.



X-RAY POWDER PHOTOGRAPHS OF (*a*), ARTIFICIALLY PREPARED $CaC_2O_4.2H_2O$; *b*, POWDERED HIPPOPOTAMUS CALCULUS, $CaC_2O_4.2H_2O$; *c*, WHEWELLITE, BURGK, DRESDEN, SAXONY

The 'stone' is a flattened irregular ovoid with a smooth surface and, according to Mrs. M. D. Leakey, originally measured about 8 cm. × 6 cm. × 4 cm. It has been broken away on one side to a depth of nearly a centimetre, revealing a concentrically laminated structure and an apparently uniform composition. The fragment brought back to England is made up of concentric zones not more than 10 μ thick and readily cleaves into layers about 1 mm. thick. Chemical tests and X-ray powder photographs show that it is identical with tetragonal hydrated calcium oxalate, $CaC_2O_4.2H_2O$ [*a* 12·40, *c* 7·37 A.][1], and not with whewellite, the monoclinic monohydrate. Examination in polarized light reveals a minutely fibrous structure with fibre axis perpendicular to the plane of zoning, and X-ray diffraction photographs of stationary sections confirm that the fibre axis is *c* [001] but reveal that the orientation of the fibres across the plane of zoning is far from perfect. Moreover, there is no orientation of the [100] axes in the plane of zoning. The optical examination and X-ray photographs show that the layers are uniform in composition and crystal size, the length of each fibre not exceeding 10 μ and the cross-section being of the order of 1 μ.

Tetragonal calcium oxalate (weddellite) is very rare as a mineral but has been reported by two of us (F. A. B., M. H. H.) from one locality in the very deep water of the Weddell Sea, and its occurrence as minute 'envelope' crystals in plants and human urine is well known. Renal calculi from the human bladder are, however, usually of mixed composition, and those examined by us in 1936 were essentially fine-grained calcium carbonate-phosphate, similar to the mineral dahllite (carbonate-apatite), studded with large crystals (2–3 mm. across) of tetragonal calcium oxalate.

F. A. BANNISTER
M. H. HEY
K. P. OAKLEY

British Museum (Natural History),
London, S.W.7.
July 28.

[1] Bannister, F. A., and Hey, M. H. Report on some crystalline components of the Weddell Sea deposits. *Discovery Rep.*, **13**, 60 (1936).

Structures Produced in Clays by Electric Potentials and their Relation to Natural Structures

IF an electric potential is applied by means of two electrodes to a remoulded soil containing a proportion of particles of colloidal size, such as London clay, the soil develops a structure which is similar in appearance to that of the clay in its natural state. This phenomenon was observed by me in 1931 on a great variety of fine-grained soils. In recent investigations carried out on London clay and Wyoming bentonite, I found that the electro-osmotic transport of pore water towards the cathode results in the formation of cracks in the soil around and between the electrodes, the pattern of the cracks following the equipotential lines. These cracks, which are filled with free water, become more widely spaced with increasing distance from point electrodes. Originating from these basic cracks an irregular pattern of additional fissures is formed. When the soil becomes consolidated, as, for example, by continued electro-osmotic drainage or drying, the fissures

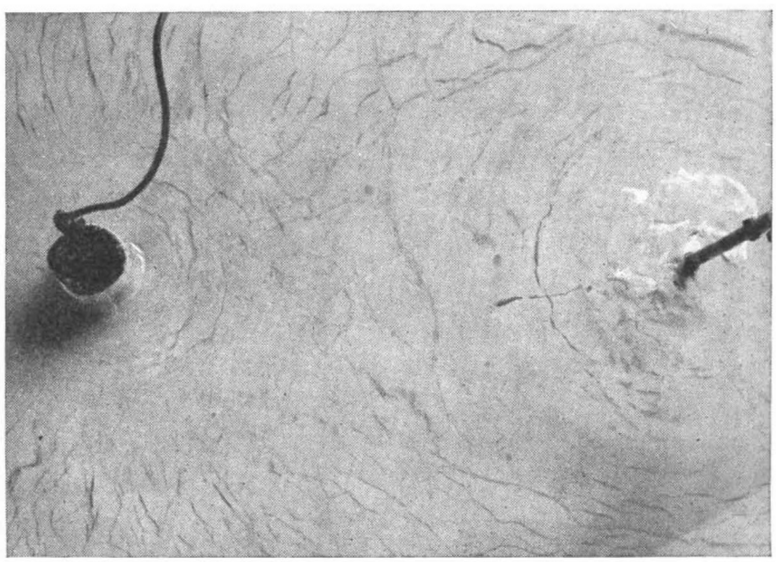


Fig. 1