Σ (cm.)	Arrangement	Counts			Photographs					
								Analysis		
		Number	Time (hours)	Rate (c.p.h.)	Total number	Time (hours)	Rate (c.p.h.)	Singles	Showers	Blanks
0	ABCD	5257	802·7	6·6	2535	372·3	6·8	1622	219	694
	ABC	2457	85·8	28·7						
20	ABCD	1648	588·0	2·8	1042	369·2	2·8	589	103	347
	ABC	1094	52·0	21·1						

electrons, and (*c*) electrons from large cascade showers. The effect of lead will be to decrease the contribution of (*a*), since disintegration electrons are of short range (~2 cm. lead), and probably to decrease the contribution of (*b*) since,

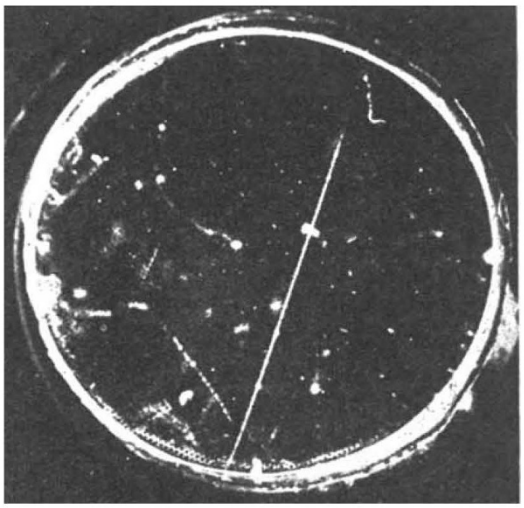

Fig. 2.

as Dr. L. Jánossy has pointed out to us, the meson will accompany the knock-on electron and thus prevent the electron from being recorded. Even if the contribution of (*c*) is the same, the total effect of the lead will be to reduce the number of electrons.

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[1] Circuit unpublished. We are indebted to Dr. B. Rossi for the use of the anti-coincidence set.

[2] Anderson, C., *Phys. Rev.*, **50**, 263 (1936); Brode, R. B., Macpherson, H. G., and Starr, M. A., *Phys. Rev.*, **50**, 581 (1936).

[3] *vide* Anderson, *ibid.*, Heitler, W., Powell, C. F., and Fertel, G. E. E., NATURE, **144**, 116 (1939).

Occurrence of Vanadium and Molybdenum in Clays

THE occurrence of vanadium in clays has been known for some time, the amounts varying from a chemical trace to about 14 per cent[1,2,4]. Mellor devised a method for determining vanadium in the presence of titanium, but the surest test is a spectrographic one. Generally the percentage is less than 1 per cent and it is not known in what form it occurs. Callister[1] in Australia noted that vanadium compounds in kaolins are not water-soluble until the clay has been heated to temperatures of above a 1,000° C. I have found similar properties in South African clays. Many fire and building bricks made from clays of Karroo age exhibit a greenish-yellow or canary-yellow efflorescence, after weathering. The efflorescence is readily soluble in hot water. This efflorescence contains vanadium and molybdenum. Molybdenum is a much rarer constituent and is not easily detected in clays, by ordinary methods. In fact the only method appears to be, to heat large lumps of the material to temperatures of about 1,000° C. and then to extract with hot water and crystallize the salts in solution.

A partial analysis of the water soluble material from an under-fired firebrick gave:

MoO_3	..	..	..	0·08 per cent
SO_3	..	..	..	1·01 per cent
CaO	..	..	..	0·28 per cent

the sample being dried at 110° C. A qualitative spectrographic analysis showed the presence of abundant sodium and vanadium and little else. Molybdenum was confirmed and iron was found in small quantities. It is noteworthy that while vanadium is easily detectable by spectrographic means, in the raw clay, molybdenum does not appear in the spectrogram. The concentration as described above must be done first.

It is possible that the vanadium and molybdenum compounds are contained in the clay complex and are not rendered soluble until these minerals are broken up. The crystals obtained from the calcination and water extraction treatment are birefringent and yellow-green in colour. They appeared to be perfectly homogeneous under the microscope.

The presence of molybdenum in mine, mineral and surface waters has been recorded by Novokhatsky and Kalinin[3], and they suggest its adsorption by freshly precipitated iron and manganese hydroxides.

Mr. Berkowitz directed my attention to this efflorescence, and his work, which preceded mine, had similar results.

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[2] Palmer, L. A., *J. Amer. Ceram. Soc.*, **12**, 37–47.

[3] Novokhatsky, I. P., and Kalinin, S. K., *C.R. Acad. Sci. U.S.S.R.*, **24**, 278 (1939).

[4] Bourry, J., "A Treatise on the Ceramic Industry" (1926).