thorium-active deposit, that is, about 1–1·5 per 10^4 β-particles of RaC, and exceeds the number of positrons due to the internal conversion of the γ-lines 1,760 and 2,220 e.kv. by a factor of about 2.

Placing aluminium plates 0·5 mm., 1 mm. and 3 mm. thick in front of the source, we tried to reveal positrons produced by β-particles from RaC in traversing the aluminium. According to D. Skobelzyn and E. Stepanowa[2], these positrons greatly exceed (50–70 times) in number those originated by the action of γ-rays in the same substance. Our measurements showed a small difference in the positron number when passing over from the thin (0·5 mm.) to the thick (3 mm.) plate; this effect arising from the partial transmission of the positrons from the source through the thinner plate.

Having placed in our apparatus a strong radon source so that positrons of the source could not reach the counters, we irradiated by γ- and β-rays and also by γ-rays only a 25μ-thick lead foil. In this experiment the positrons going from the lead strip to the slit of the apparatus made an angle of 90° with the direction of β-particles and γ-rays. The number and the spectrum (II, Fig. 1) of positrons observed indicate clearly that most of the positrons are produced by γ-rays of RaC. Thus we are led to the conclusion that the cross-section for the production of pairs by γ-rays of RaC is at least several times greater than the cross-section for β-particles of RaC; as in the case of lead, so in that of aluminium.

A. I. ALICHANOW.
A. I. ALICHANIAN.
M. S. KOSODAEW.

Physico-Technical Institute,
Leningrad.
Sept. 22.

[1] A. I. Alichanow, A. I. Alichanian and M. S. Kosodaew, NATURE, **136**, 475, Sept. 21, 1935.
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'Extra' Rings in Electron Diffraction Patterns

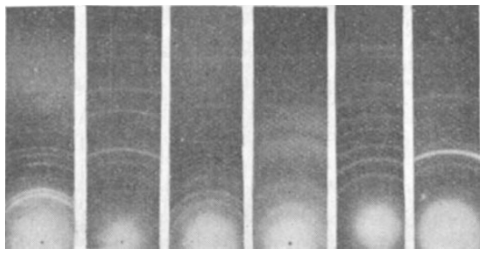
MARK, Motz and Trillat[1] have shown that traces of grease can give rise to 'extra' rings in electron diffraction patterns from metal films. In agreement with them, we have found that the spacings of these grease rings are as given in col. 1 of the accompanying table, and are independent of the nature of the metal substrate. The spacings of 'extra' rings obtained by

'Extra' Ring Spacings in Angström Units

1	2	3	4	5	6
4·02	4·81	3·85	4·49	3·75	4·93
3·62	4·00	3·46	2·57	2·93	4·09
2·90	2·79	2·81	1·69	2·44	3·37
2·43	1·83	2·45	1·50	1·81	3·24
2·30	1·61	2·31		1·57	2·85
2·17	1·49	2·15			2·57
2·01		2·05			1·70
1·92		1·83			
1·81		1·62			
1·71		1·49			
1·58		1·40			
1·47		1·29			

heating a metal in a gas are, however, quite different in that they depend not only upon the metal but also upon the gas and the nature of the heat treatment[2]. Thus, for example, we have obtained different 'extra' ring systems by drawing gold leaf through a Bunsen flame (col. 2) and by heating in oxygen at 540° C. during 30 minutes (col. 3). The reproductions 1–6 are from the corresponding electron diffraction patterns.

We have also found that amalgamation gives rise to 'extra' ring systems which, like those due to absorbed gases, have spacings dependent upon the metal. The spacings found for some gold, silver and copper amalgams, and given in cols. 4, 5 and 6 respectively, are quite different from those due to either grease or absorbed gases. The gold and silver amalgams were prepared by suspending the metal leaf in the vapour above a warmed drop of mercury until signs of amalgamation were visible at the lower edge of the leaf. Copper amalgam was obtained by immersion in a mercuric chloride solution.



1 2 3 4 5 6

In studying the absorption of gases by metals, it is therefore important to exclude the formation of 'extra' rings due to grease or amalgamation; whilst the former should, for the reasons given above, always be easy to recognise, the amalgam 'extra' rings appear to have much in common with absorbed gas 'extra' rings, at least in so far as the spacings of both vary from metal to metal.

G. I. FINCH.
A. G. QUARRELL.

Imperial College of Science
and Technology,
South Kensington,
London, S.W.7.
Oct. 16.

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Structure of Solid Oxygen

As is well known, solid oxygen appears in three modifications: α (below 23·5° K.); β (23·5°–43·5° K.); and γ (43·5° K. and melting point). In connexion with our investigations on the structure of solidified nitrogen and other gases, extensive work has been done with the object of determining the structure of the various forms of solid oxygen.

Already in 1927, McLennan and Wilhelm[1] published a powder diagram of α-oxygen which they tried to interpret by means of a rhombic cell. We found, however, that their interpretation could not account for the intensity distribution of the spectrum. Later on, powder diagrams of α- and β-oxygen were given by Ruhemann[2]. The two forms gave similar diagrams, which he tried to interpret by means of the rhombic cell proposed by McLennan; the result was not satisfactory.

In 1929 and following years, we obtained powder diagrams of β-oxygen, showing a large number of lines, but we found that the rhombic cell of McLennan could not account for the lines appearing in our diagrams. They were, however, satisfactorily interpreted by means of a trigonal (rhombohedral) cell, containing six molecules ($a = 6·19$ A., $\alpha = 99·1°$) corresponding to a density $\rho = 1·395$.