already applied for energies below 60 kv. When sources of RaE not free from RaD were used, the lines of the natural β-spectrum of RaD—30, 42 and 45 kv.—were observed.

A series of special experiments was carried out to verify that the observed low energy electrons were not of secondary origin. Having placed a mica screen 3×10^{-3} gm./cm.^{2} thick in front of the counter, we were able to assure ourselves that the number of electrons recorded by the counter diminished by the amount expected from absorption curves obtained with cathode rays[1].

Having put our source on the bottom of the apparatus to prevent electrons from the source reaching the counter, we were also able to ascertain that owing to the large distance from the source to the walls of the apparatus and the first slit, the number of scattered electrons was in practice very small.

The spectrum of RaP^{30} was investigated in another apparatus ($\rho = 3$ cm.), the positrons being recorded in the same manner by a counter provided with a window covered with a nitrocellulose film 5×10^{-4} gm./cm.^{2} thick. The divergence of the beam focused was about 40°. The apparatus was exhausted to a pressure of about 0·05 mm. Hg. As a source, an aluminium strip 10 μ thick irradiated by α-particles of RaC from a 200 millicurie radon tube[2] was used. The measurements were always started 2 minutes after the irradiation had finished. The spectrum curve obtained is shown in Fig. 1 (II), the lower scale on the abscissa axis referring to this curve. The statistical error in this case does not exceed 3 per cent.

Thus comparing the spectra of RaP^{30} and RaE, a considerable difference in the shape of the β-spectra from elements of low and high atomic number respectively is observed; in the case of RaP ($Z = 15$) the spectrum curve has a distinct maximum, and tends continuously to zero energy, while the curve for RaE ($Z = 83$) seems to intersect the axis of ordinates.

A detailed account of these experiments will be published in the *Physikalische Zeitschrift der Sowjetunion*.

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Use of the Micro-Thermal Conductivity Method for the Determination of Heavy Hydrogen

IN a recently published note[1], Messrs. Newell, Purcell, Gregory and Ellingham make the following statement concerning our micro-thermal conductivity method for the analysis of heavy hydrogen[2].

"In attempts to apply this method [that is, the method by A. and L. Farkas], however, we did not succeed in finding conditions yielding reliable results of the accuracy required; and, from a consideration of the factors influencing thermal conductivity, operation at a notably higher pressure seemed more promising, since the measurement then rests on a simpler and more definite physical basis."

Since such a statement is, in our opinion, liable to raise some doubt about the applicability, reliability, accuracy and physical basis of the micro-thermal conductivity method, we should like to direct attention to the following points:

(1) The method is based on the well-established temperature variation of the specific heat of hydrogen and deuterium.

(2) The method possesses a certain advantage in that the amount of gas required for a single analysis is only a few cubic millimetres (N. T. P.) and that it allows us not only to determine the percentage deuterium in a given sample but also to estimate the relative amounts of the three molecular species H_2, HD and D_2, and to discriminate between ortho- and para-hydrogen or ortho- and para-deuterium.

(3) We have had no difficulty in obtaining an accuracy in our measurements of 0·1–0·2 per cent deuterium.

(4) The method has now been in use for more than two years in several investigations including one concerning the electrolytic separation of the hydrogen isotopes[3]. The reliability of the method appears to be fully established by the fact that it is in actual use in some half a dozen university laboratories in Germany, in the United States and in Great Britain.

Why Messrs. Newell, Purcell, Gregory and Ellingham failed to obtain reliable results using the micro-thermal conductivity method for the estimation of heavy hydrogen is not evident from their note.

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An X-Ray Examination of Atomic Vibrations in Zinc and Cadmium

A SHORT time ago, experimental results were published by the present writer and F. W. Spiers on the X-ray scattering factors of nickel, copper and zinc atoms for copper $K\alpha$ radiation. While the observed values for nickel and copper lay on smooth curves when the scattering factors were plotted against $(\sin\theta)/\lambda$ in the usual way, in the case of zinc the scattering factors for certain reflections were found to lie well off the mean curve. It was noted at the time of publication that these discrepant results were consistently obtained and it has since been found that similar results are obtained with cadmium; both metals have a closed packed hexagonal structure with axial ratios $c/a = 1{\cdot}856$ for zinc and 1·886 for cadmium. Cadmium is a more favourable metal to investigate for, having larger lattice spacings, it gives more reflections than zinc and they are relatively stronger.

An examination of these apparent discrepancies has shown that reflections from atomic planes which make small angles with the basal plane of the cell give relatively low scattering factors, while planes