Letters to the Editor

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NOTES ON POINTS IN SOME OF THIS WEEK'S LETTERS APPEAR ON P. 407.

CORRESPONDENTS ARE INVITED TO ATTACH SIMILAR SUMMARIES TO THEIR COMMUNICATIONS.

Radio-Helium

THE following experiment concerning the nature of the radioactive element produced in beryllium when bombarded by fast neutrons[1] was made on the suggestion of Dr. O. R. Frisch.

Beryllium was precipitated as a hydroxide in a very fine-grained form (this was kindly done for us by Prof. G. v. Hevesy), so that it might be able to give off any helium produced in the process. The $Be(OH)_2$ powder was bombarded by neutrons from a beryllium-radon source of about 200 mc. strength, and a stream of hydrogen was at the same time passed through the tube containing the $Be(OH)_2$ and then through a capillary tube to a thin-walled jacket around a thin-walled Geiger counter. The distance between the neutron source and the counter was 60 cm., and the latter was properly shielded by lead.

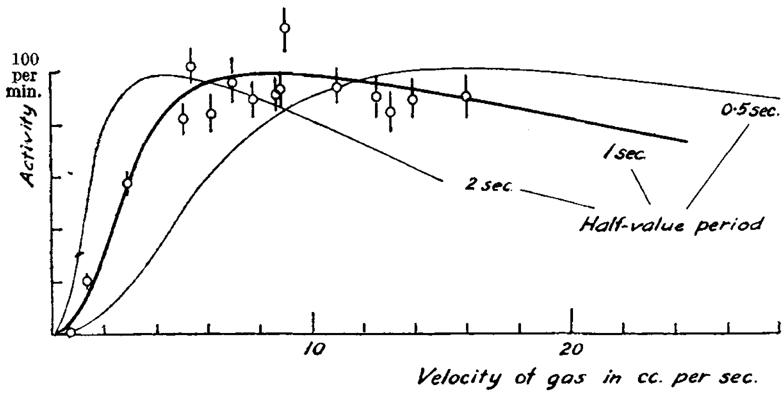

FIG. 1.

When the velocity of the gas was zero, the rate of counting was 20 per minute: when the velocity of the gas was increased, the counting rate increased as shown in Fig. 1, where the counting rate (less the γ-ray effect of 20 per min.) is plotted against the velocity of the hydrogen. This shows that a radioactive body *in a gaseous state* is produced in the $Be(OH)_2$. From the volumes of the $Be(OH)_2$ tube, the capillary and the jacket around the counter, one can calculate roughly the shape of the curve for the cases of the activity having a half-value period of 0·5 sec., 1 sec. or 2 sec. These curves are drawn in Fig. 1, and it is seen that the activity has a half-value period of about 1 sec., thus being identified as the one previously reported[1].

A radioactive gas produced by bombarding ${}^{9}_{4}Be$ by neutrons could scarcely be anything but ${}^{6}_{2}He$ or possibly ${}^{5}_{2}He$.

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July 29.

[1] T. Bjerge, NATURE, 137, 865 (1936).

β-Ray Spectrum of Radio-Helium

IN order to investigate the energy distribution of the β-rays from radio-helium[1], we have employed an expansion chamber constructed by Dr. J. C. Jacobsen and kindly lent to us. In the middle of the top plate, a thin-walled brass cylinder (0·05 gm. per cm.^{2}, 1·5 cm. diameter) was inserted, into which an activated beryllium cylinder could be dipped. The latter was made of beryllium powder (0·12 gm. per cm.^{2}) stuck on to a brass tube (0·1 gm. per cm.^{2}) and could be moved automatically from a position around a neutron source (beryllium-radon) to the position in the Wilson chamber in 0·4 sec., this movement also starting the timing arrangement for expansion and light. A suitable lead shielding was arranged which cut down the electrons due to the γ-rays to a number small compared with the number of β-rays. The radioactivity induced in the brass tube carrying the beryllium is negligible as the latter is exposed to the neutrons only for a few seconds at most every minute.

The β-rays were bent by a magnetic field of 1,500 oersteds. The gas in the chamber was air at about half an atmosphere pressure, the condensing vapour a mixture of ether and alcohol.

Radio-helium emits negative electrons. 120 tracks have been measured and corrected for the stopping power of the brass cylinder and half of the beryllium layer. The uncertainty in the individual values of $H\rho$ is estimated to be about 10 per cent. The energy spectrum obtained is shown in *Fig. 1.* As usual, it is somewhat difficult to determine the

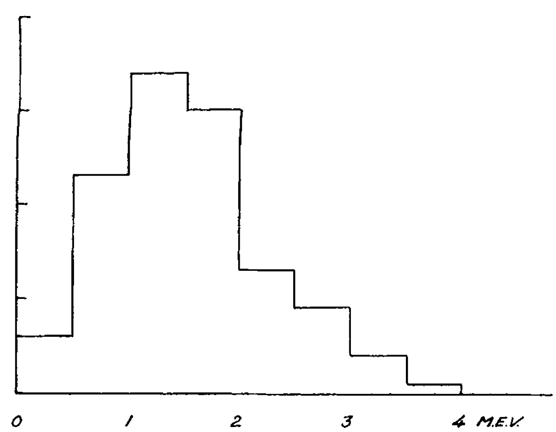

FIG. 1. Energy spectrum of β-rays from radio-helium.

upper limit: the scarcity of tracks in this region tends to give a value which is too low, whereas the