

228. *The Radioactivity of Potassium prepared from Animal Tissue.*

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As a result of theoretical considerations, Klemperer (*Proc. Roy. Soc.*, 1935, *A*, **148**, 638) and Newman and Walke (*Phil. Mag.*, 1935, **19**, 767) suggested that the "natural" radioactivity of potassium is due to a very small amount of an isotope of mass number 40: this isotope was subsequently discovered by Nier (*Physical Rev.*, 1935, **48**, 283; 1936, **50**, 1041) and by Brewer (*ibid.*, 1935, **48**, 640). Its connection with the radioactivity was recently confirmed by Smith and Hemmendinger (*ibid.*, 1937, **51**, 178). Although it is true that this isotope is present in all known potassium salts to the same extent, yet it appeared questionable whether this would be the case for the potassium contained in living tissues. Ernst (*Naturwiss.*, 1934, **22**, 479) reported that potassium of animal origin shows a greater activity, as detected by the photographic method, than potassium of mineral origin. A similar result was obtained by Loring and Druce (*Chem. News*, 1930, **140**, 34) with potassium prepared from potato plants. In view of the importance of the question, we carried out the present investigation.

The whole muscular tissue of three adult rabbits, taken immediately after the animals had been killed, was finely minced and twice extracted in boiling distilled water. The extracts, from each animal separately, were concentrated to a small volume, rendered as far as possible free from protein, and the potassium* precipitated as perchlorate, which, after being separated,

* Estimations of potassium in the muscle residue indicated that nearly all of it present in the fresh tissue was extracted.

was washed with absolute alcohol. The dry potassium perchlorate was then converted into chloride by ignition. This, after being recrystallised several times, was dissolved in a small amount of water. In one case the solution contained 2.75 g. of the chloride in 10 c.c. of water, and in the other two cases a saturated solution was used.

The activity of these solutions was measured by means of a Geiger-Müller counter and compared with that of control solutions of the same concentration which had been prepared from ordinary potassium chloride (A.R.). For this purpose the solutions were pipetted into a glass mantle with a very thin interior wall, which fitted over the counter.

It was found, in all cases, that the activity of the "tissue potassium" was, within the statistical error, identical with that of the potassium of mineral origin. In some of our measurements the error was reduced to about 2%, so we conclude that the content of $^{40}_{19}\text{K}$ in the two kinds of potassium cannot differ by more than is indicated by this limit.

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