thin for secondary scattering and others are unfavorably malformed) not every (111) ray should have accompanying progeny.

[1] L. H. Germer, Phys. Rev. 61, 309 (1942).

Absence of High Energy Beta-Rays from Br^{82}

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April 23, 1942

J. ROTBLAT[1] has reported a group of high energy beta-rays from the disintegration of Br^{82}, in addition to the main group of maximum energy 0.46 Mev. From absorption measurements the end point was estimated to occur at about 1.2 Mev, and the abundance to be about 3 percent of the main group. These findings were in contradiction to the author's previous beta-ray spectrometer measurements.[2] Since the disintegration of Br^{82} is accompanied by three gamma-rays, the hardest of which has an energy of 1.35 Mev,[3] the high energy electrons could be Compton recoil or photoelectrons due to these gamma-rays.

The widespread use of this isotope in biological studies as well as the fact that its disintegration scheme is otherwise quite well understood,[3] made it appear desirable to determine the origin of the high energy group. An absorption experiment was therefore performed with a view to reducing the secondary effects due to gamma-rays to a minimum. The source was prepared by the method of Roberts and Irvine[4] from $C_2H_2Br_4$ irradiated by slow neutrons from the M. I. T. cyclotron. It was deposited as a thin layer of AgBr on a small piece of filter paper which, in turn was suspended on a narrow strip of paper at least 10 cm from all solid material with exception of the collimating diaphragm as shown in Fig. 1A. The number of secondaries from this diaphragm should not be materially affected by the addition of absorber. The curve marked "good geometry" in Fig. 1 represents the data obtained in this arrangement and shows no evidence of a high energy group. The dotted line indicates approximately the result expected in the presence of such a group of 3-percent abundance.

In order to increase the accuracy of the experiment further, it was repeated in the arrangement shown in Fig. 1B. The beta-rays had to pass through the lower counter into the upper one and only coincident counts in both counters were recorded. This reduced the relative gamma-ray background by a factor of four compared to the arrangement shown in Fig. 1A, the remaining gamma-ray counts being due to recoil electrons produced in one counter passing into the other. The curve marked "coincidences" in Fig. 1 shows the results after correcting for absorption in the counter windows. The dotted line again indicates the "tail" expected from a high energy group. We may conclude that no such group is present with an abundance as high as 0.5 percent of the main group. This is in agreement with the disintegration scheme proposed by Roberts, Downing, and Deutsch.[3]

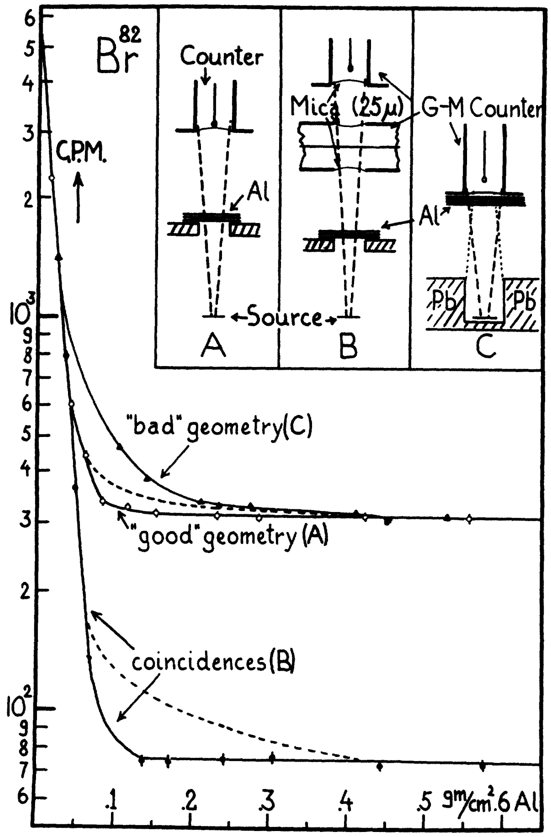

FIG. 1

Finally an absorption experiment was performed under conditions favoring effects due to secondary electrons. In this arrangement, shown in Fig. 1C, a considerable number of secondary electrons produced in the lead "well" surrounding the source, should be absorbed by addition of aluminum absorbers. The curve marked "bad geometry" in Fig. 1 does indeed show a shape very similar to that expected from a high energy beta-ray group. Rotblat's results are therefore probably best interpreted by assuming that his experimental arrangement was intermediate between those shown in Fig. 1A and C.

This effect is to be expected whenever beta-rays are accompanied by gamma-rays whose energy is greater than the maximum energy of the beta-rays. We have found the high energy electrons from Fe^{59} reported by Livingood and Seaborg[5] to be also due to secondary effects. A detailed study of this latter disintegration will be published shortly.

[1] J. Rotblat, Nature 148, 371 (1941).
[2] M. Deutsch, Phys. Rev. 59, 684A (1941).
[3] A. Roberts, J. R. Downing, and M. Deutsch, Phys. Rev. 60, 544 (1941).
[4] A. Roberts and J. W. Irvine, Jr., Phys. Rev. 53, 608 (1938).
[5] J. J. Livingood and G. T. Seaborg, Phys. Rev. 54, 51 (1938).