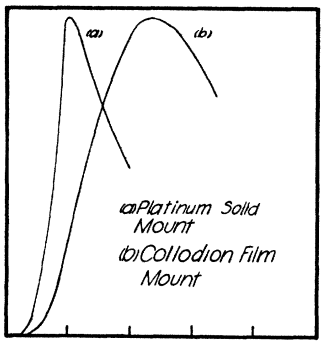

FIG. 1.

Preliminary measurements have also been made using RaE in the form of a radioactive vapor formed by the interchange of RaE, an isotope of Bi, with Pb in $Pb(CH_3)_4$, as described by Richardson and Leigh-Smith.[3] These measurements, though incomplete, indicate the same general behavior for the spectrum.

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On the Positive Particles Occurring from P^{32} in the Cloud Chamber

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THE ratio of occurrence of "positive" tracks from beta-emitters as determined from cloud-chamber measurements has been consistently higher than the ratio found by other methods of investigation by at least an order of magnitude. In order to determine if the ratio is dependent on the type of source mount used for the active material in the chamber, we have taken a number of stereoscopic pictures of the tracks arising from a source of P^{32} supported between two films of collodion, approximately 0.15 micron thick, in a cloud chamber filled with air and operated at approximately atmospheric pressure. A source having a very high specific activity was obtained by using the separated isotope P^{32} available from the United States Atomic Energy Commission at Oak Ridge. A total of 1493 pictures was taken using a chamber 7 inches in diameter and $2\frac{1}{4}$ inches deep, using a magnetic field strength of 400 gauss. Analysis of the pictures showed 7240 electron tracks and 11 positive tracks, a ratio of 0.15×10^{-2}. In order to obtain the best statistics possible all positives and negatives arising from the source were considered, regardless of their age. The ratio obtained is somewhat smaller than the values given by Sizoo, Barendregt, and Griffioen,[1] who used a glass capillary source mount in the center of the chamber, and Smith and Groetzinger[2] who mounted the P^{32} source at the end of a short aluminum channel which led into the chamber; but the ratio is in agreement with the values given by Pi and Chao,[3] who use glass capillary source mounts. Calculations made from the relation for multiple scattering given by Bethe[4] showed that only approximately 20 percent of the positives could be accounted for by multiple scattering of electrons, which is in agreement with the result of Heine,[5] who found no decrease in the ratio when a H_2+He mixture was used as the gas in the chamber. Since our ratio is not significantly different from those given by Pi and Chao, it appears that the behavior of the positives is not dependent on the nature of the source support used for the active material in the chamber.

In order to investigate the discrepancy between cloud-chamber results and the results of other methods of investigations, two experiments appear possible. An increase in the ratio of positives to negatives found by operating a magnetic beta-ray spectrograph with a small amount of the vapor used in the cloud chamber compared to the value with an evacuated spectrograph would indicate that the positives could be ascribed to scattering of electrons. Secondly, measurements made with a cloud chamber of at least twice the dimensions of the present chamber and filled with a H_2+He mixture would be relatively free from any uncertainty in the origin of the positive tracks. The very intense light available from flashtubes would enable pictures to be taken using such a deep chamber without loss of definition because of a small depth of focus which would occur if less intense light sources were used. Such an experimental arrangement could be used to test effectively the hypothesis given by McCusker[6] that the positives arise either from multiple scattering of electrons or from electrons which travel a full circle and return to the source.

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A Comparison of the Beta-Spectra of C^{14} and S^{35}*

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IN a recent paper[1] by one of us, absorption curves and Feather analyses[2,3] were presented for the β-radiations of C^{14} and S^{35}. In view of the fact that there was a marked difference in the shape of the Feather plots of the two β-emitters, which in turn would indicate a difference in the shape of their energy spectra,[3] it seemed advisable to repeat the absorption work under carefully controlled and identical conditions in order to determine whether or not a real difference exists.

For the absorption measurements essentially weightless sources (<0.1 mg) of high specific activity were evaporated in stamped copper cups over an area of about 0.5 cm^2.