Another point of interest is the radioactive decay of the mesotron predicted by the theory of Yukawa. In the five slow mesotron tracks ending within the chamber volume, observed by Maier-Leibnitz, there is no indication of a decay electron. It seems that the evidence which other investigators have obtained concerning this point, is also rather meager.[20] Therefore, it may be supposed that, for slow mesotrons, there exists another mode of annihilation.

Conclusion

Though further evidence is required on some of the points mentioned above, there are several experimental facts which may be explained in the simplest way by assuming production of secondary mesotrons of medium or low energy by the fast mesotrons of the hard cosmic-ray component, and by photons:

1. Generation of narrow, penetrating showers by the hard component (second maximum of the Rossi curve), and by a soft non-ionizing radiation, probably photons (first maximum of the Rossi curve);

2. Occurrence of stopped mesotrons at a considerable rate;

3. High energy losses of fast mesotrons in metal plates, frequently not connected with observable secondaries.

This interpretation is not out of harmony with present theory.

[20] P. Ehrenfest (Comptes rendus **206**, 428 (1938)) has obtained a photograph which probably has to be interpreted as a mesotron entering the wall of the cloud chamber, and the decay electron leaving the wall.

Discussion

W. M. Nielsen and J. E. Morgan, *Duke University* AND **K. Z. Morgan,** *Lenoir Rhyne College:** Measurements have been made of 7° and 28° cosmic-ray shower production in iron up to thicknesses of approximately 320 g/cm. A comparison of the data here presented and measurements previously reported for 38° showers leads to the conclusion that there is no significant difference in the ratio of counting rates at the first maximum of the Rossi transition curve to that under 200 g/cm for either large or small angle showers. It is concluded that the processes which are responsible for the character of the transition curve under large thicknesses of material are not necessarily restricted to small angles.

J. Clay, *Amsterdam:* To check the results of Professor Bothe, Mr. Jonker and I tried to find the second maximum of showers under lead by taking small angle showers. We placed one counter directly under the lead and two counters so far below that we could measure the showers with a maximum deviation of 7.2° and of 3.9°. (See Fig. 1.) The measurements were extended so long that we had about 1600 coincidences for every point; so that we have an uncertainty of about 2 percent for each point. The indication of the second maximum is there, but smaller than in our earlier observation with the larger angles. We do not find the second maximum as large as did Professors Bothe and Schmeiser.

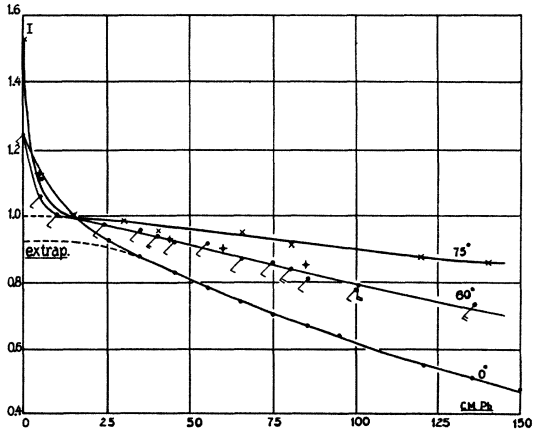

FIG. 1.

* Cf. Phys. Rev. **55**, 995 (1939) for complete paper.