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SOME PRELIMINARY CLOUD CHAMBER PHOTOGRAPHS OF ARTIFICIAL MESONS

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The 184-inch cyclotron has recently been converted so that it accelerates protons up to an energy of 350 Mev. A cloud chamber has been operated in the neutron beam which is produced when the 350 Mev protons are allowed to strike a two-inch copper target. The first run has yielded several tracks that may be definitely classified as meson tracks though we are not able to distinguish between light and heavy mesons.

The cloud chamber was operated in a magnetic field of 21,700 gauss and contained 1-1/2 atmospheres of argon with water vapor. The neutron beam was six inches in diameter and was allowed to strike the chamber so that it traversed both the top glass and the lucite at the bottom of the chamber. Out of 100 photographs, seven examples have been found that are definitely the tracks of mesons of two or three Mev. They were all produced in either the top or bottom of the chamber; and in all cases but one, they were observed only to traverse the illuminated region. They have been identified by the fact that their radii of curvature are $\sim$ 5cm whereas a proton stops while its radius is larger than 10 cm. The meson tracks show ionization comparable to that of a slow proton. Fig. 1 is a photograph of the first meson observed; its radius of curvature corresponds to a π-meson of 2.3 Mev or a μ-meson of 3.0 Mev. Fig. 2 shows the capture of a negative meson by a nucleus, presumably by an argon nucleus. The resulting star has two heavy fragments.

Another interesting group of tracks has been observed in the same film. They are particles that ionize near the minimum but are curved too much to be protons. They may be either fast electrons or fast mesons. Their curvatures

correspond to electrons of about 150 Mev or mesons of about 70 Mev. If electrons, they may result from the bremstrahlung of suddenly accelerated protons. though there is no reason for not expecting to see mesons of this energy.

We wish to thank Professor E. O. Lawrence for his interest and encouragement. This work was done under the auspices of the Atomic Energy Commission.

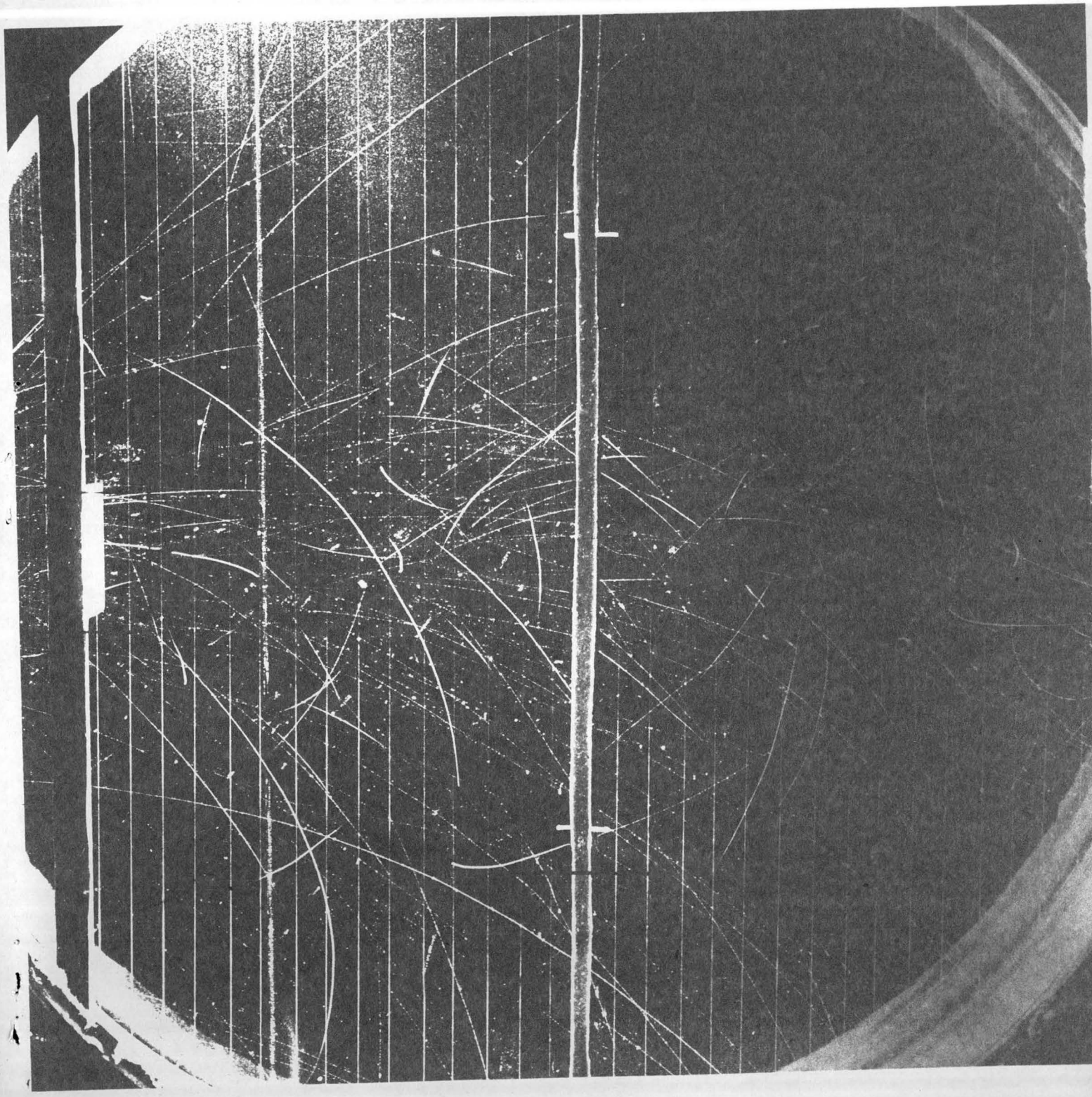

Fig. 1

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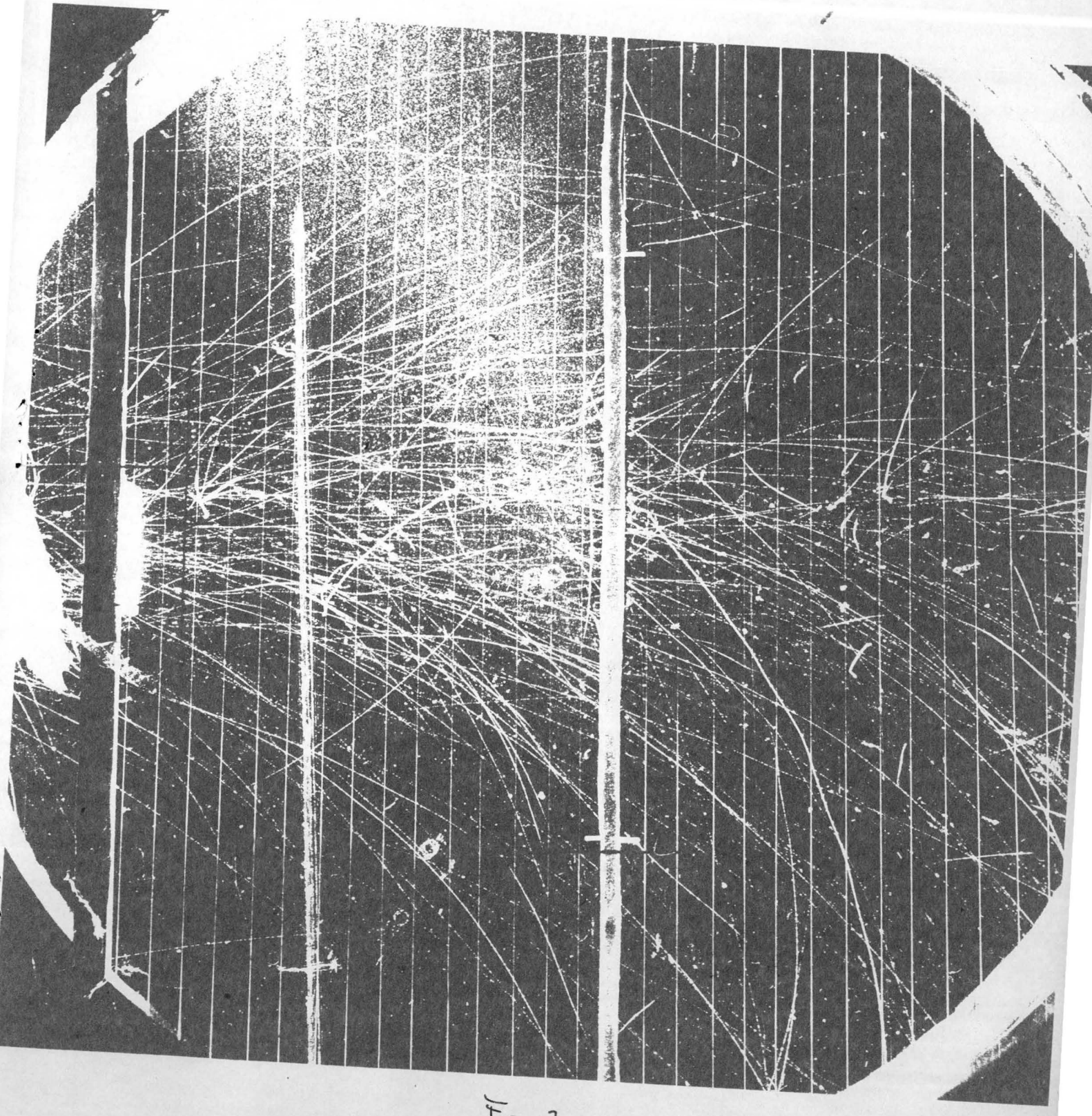

Fig. 2