stars. For this reason it is assumed that all of the 2- and 3-prong stars were produced by negative $\mu$-mesons. The percentage of stopped negative $\mu$-mesons which produce stars in emulsions is then $3.1\pm0.6$ percent. This percentage of stars produced by negative $\mu$-mesons appears to be somewhat lower than the percentages reported by George and Evans[2] and Fry[3] who found that $8.7\pm1.7$ and about 8 percent of the $\mu$-mesons which were captured produced stars. Since 61 percent of the negative $\mu$-mesons are captured in the emulsion, the percentage of captured negative $\mu$-mesons which produce stars is then $(3.1/0.61)=5.2\pm1$, which is to be compared with $8.7\pm1.7$ found by George and Evans. The low percentage of stars produced by negative $\mu$-mesons indicate that the nuclear capture of negative $\mu$-mesons results in very little excitation of the nucleus.

A search was made for decay electron tracks associated with the end of 500 of the 1000 meson endings. In 196 cases a decay electron track was observed from the end of the meson track. In 288 cases the meson tracks stopped without associated tracks other than low energy electron tracks[4] ($15<E_e<100$ kev). The percentage of negative $\mu$-mesons which decay in photographic emulsions is then $(196/500)(100)=39\pm3$. In order to estimate the efficiency of detecting the decay electrons from $\mu$-mesons, 88 positive $\pi$-$\mu$ decays were studied in plates from the same batch of emulsion. The decay electron tracks were observed from the end of the $\mu$-meson tracks in all but two cases. It is known that mesons which stop in a material of $Z=11$ have about equal probabilities of capture and decay.[5] If it is assumed[6] that the capture probability is proportional to $Z^4$, then nearly all of the negative $\mu$-mesons which stop in gelatin should decay, while essentially all of the $\mu$-mesons which stop in silver bromide crystals should be captured. Since the emulsions consist of crystals of Ag and Br imbedded in gelatin, the relative numbers of mesons which stop in the crystals and in the gelatin would seem to be proportional to the stopping power of the two materials for very low energy mesons. Using the percentage of negative $\mu$-mesons which decay and the composition of the emulsions, the ratio of the stopping power per atom of Ag or Br to the average stopping power per atom in the gelatin, for low energy mesons, is found to be 4.8. If the stopping power per atom is incorrectly assumed to be proportional to $Z$, the ratio of the two stopping powers is about 12.

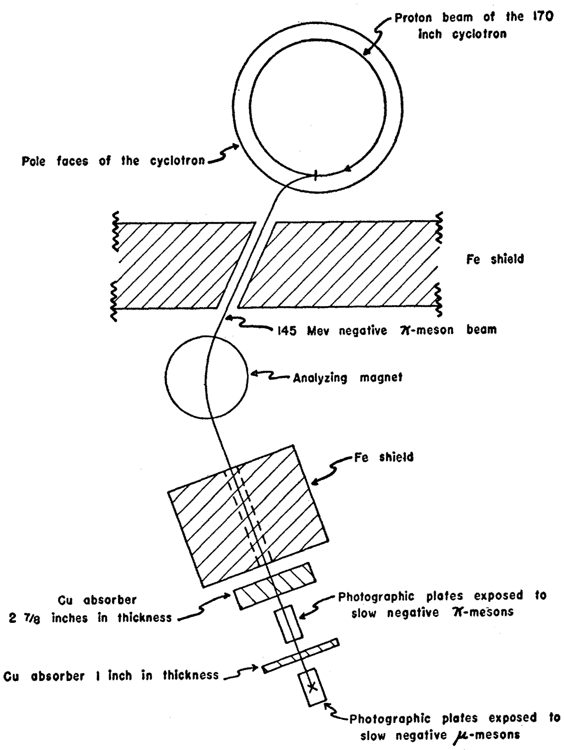


FIG. 1. The geometry of the exposure of photographic plates to slow negative $\mu$-mesons.

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† AEC Postdoctoral Fellow.

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## Striations in the Hydrogen Glow Discharge

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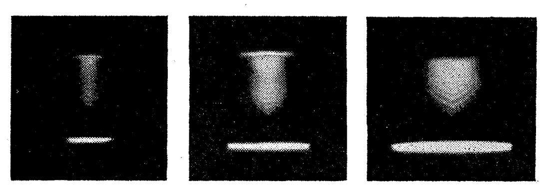
IN a recent letter, Fowler[1] states that the striations obtained in a low pressure hydrogen glow discharge do not form opposite the entrance to a side arm of the main tube. He suggests that striations can only exist when completely bounded on their periphery by solid matter. This condition does not hold for pressures ~760 mm Hg, as can be seen from the enclosed photographs (Fig. 1) and those of Fan,[2] showing the striations in a high pressure glow discharge in hydrogen.

For low pressure discharges, Druyvesteyn and Penning[3] state that for striations to appear in hydrogen the product of pressure ($p$ mm Hg) and tube radius ($R$ cm) must satisfy the empirical relation

$$pR=m,$$

where $m\sim2$ but depends on the current.



(a) (b) (c)

FIG. 1. Striations in a high pressure glow discharge in hydrogen, at 1 atmos pressure. Length = 3 mm. (a) Current = 0.1 amp, (b) current = 0.25 amp, (c) current = 0.5 amp.

The side arm in Fowler's apparatus increases the effective radius of the main tube at the junction of the side arm with the main tube, and it may be that at this point the product $p\times$effective radius has a value greater than that necessary to cause striations. On the other hand, Lau and Reichenheim[4] have concluded that the recombination of H atoms to $H_2$ molecules at the walls is important for the appearance of striations.

A satisfactory theory of striations has not yet been put forward, and it appears indeed that the complete interpretation of striation phenomena will not be easy.

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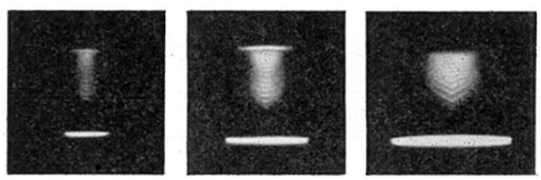

(a) (b) (c)

FIG. 1. Striations in a high pressure glow discharge in hydrogen, at 1 atmos pressure. Length = 3 mm. (a) Current = 0.1 amp, (b) current = 0.25 amp, (c) current = 0.5 amp.