

RADIOACTIVE TIPS FOR THE LECTURE TABLE

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A number of years ago the author¹ described a radioactive tip consisting of a solid cane of Pyrex glass about 2 mm in diameter and 5 cm long carrying on one end a minute quantity of a radioactive salt of high activity for furnishing the source of positive rays (alpha particles) in a simple Wilson cloud chamber.

To prevent the radioactive material from flooding the chamber with emanation, and also to guard against the active salt being washed off by coming in contact with the water within the apparatus when in use, the tip carrying the salt was (and still is) covered with a very thin film of glass (Pyrex) to keep back the emanation but which allows the alpha particles to pass freely.

The tip while being fabricated is tested by placing it temporarily in a cloud chamber. If less than 5 alpha ray tracks result on each expansion it is rejected. An occasional one may give 10 to 15 tracks. For purposes however of showing the phenomenon to a class the number of resulting tracks should be between 5 and 10. More than 10 is like watching a four ring circus.

These tips are being used at the present time for other purposes in the physical sciences, notably for showing the discharge of electroscopes on the lecture table. For this purpose stronger tips are desired. The stronger the tip, i.e., the more radioactive material that it carries, the more rapid the discharging effect, and also the farther away this effect may be noticed.

Tips that are used in the open should be handled with care. The active end with its covering of thin microscopic glass is easily injured by touching with the finger or by rough handling. Tips for lecture table demonstrations should each produce from 25 to 50 alpha ray tracks on expansion. It is impracticable to make each larger or stronger because of constructional difficulties. Hence if sources of radioactivity of greater strength than 50 alpha ray tracks (on the scale cited above) are desired, as in

the case of discharging an electroscope at a distance, two or more tips may be assembled in bundles as shown in fig. 1.

In the figure, *a* represents a single finished unmounted tip. It is in this form that they have their greatest use.

To prevent the active ends from being touched in handling, or injury in use, it is recommended that these bundles be mounted in glass envelopes the open end of each to project about 2 mm beyond the ends of the tips encased. The mounting of a single cane is shown at *b* in fig. 1; and for a bundle of 3 canes, at *c*. The corresponding end views are also shown. The mount is entirely of glass

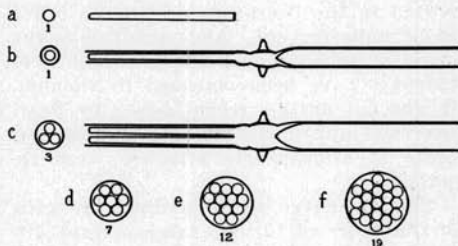


Fig. 1

and with handle is about 15 cm long. To prevent it from rolling off the table each envelope has 3 equally spaced glass nibs fused on it (only two are shown) as indicated at *b* and *c*. The end views of these larger bundles containing 7, 12, and 19 tips respectively, mounted within glass envelopes, are shown at *d*, *e*, and *f*.

Obviously, for a given distance from an electroscope, the rate of discharging it is directly proportional to the number of tips, providing of course that all emit approximately the same number of alpha particles. This condition is approached as nearly as possible in their manufacture. A strong radioactive deposit will fail to produce tracks (when tested as above indicated) if a thick film of glass is used for a cover. Hence great care must be exercised in their fabrication, and, further, radioactive salt of suitable intensity is expensive.