A note on the interference of cations and anions in paper electrophoresis

The independent movement of cations and anions in the electric field is no doubt one of the fundamentals of the ionic theory and has been repeatedly observed in paper electrophoresis. We wish to report here one apparent deviation from independent migration, which was observed while investigating complexing between cations and anions.

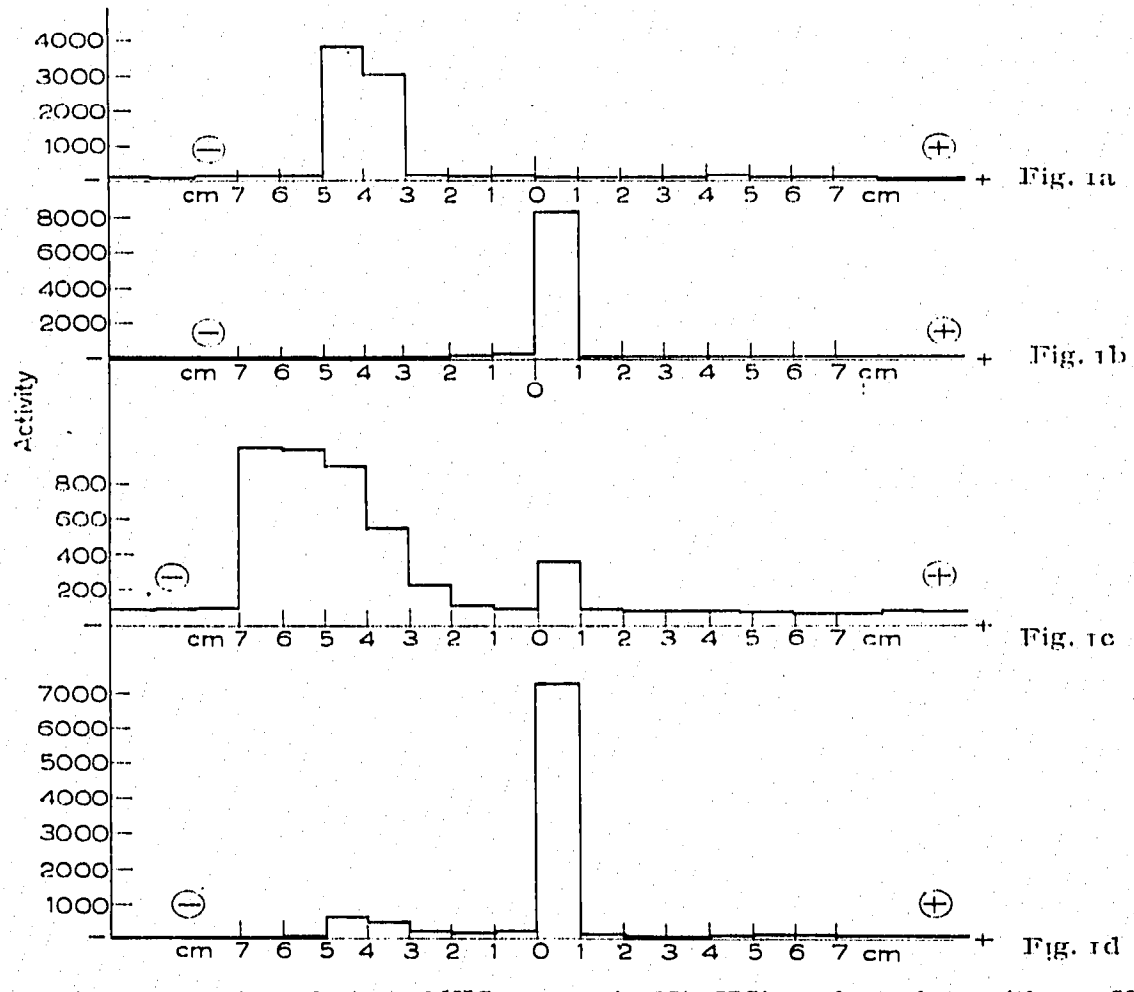

Fig. 1a. Electropherogram of a solution of ^{137}Cs tracer in $N/2$ HCl as electrolyte with 300 V for 27 min (glass plate technique).
Fig. 1b. Electropherogram of a mixture of $M/10$ $K_4Fe(CN)_6$ with ^{137}Cs tracer. Conditions as in Fig. 1a.
Fig. 1c. Electropherogram of a mixture of ^{137}Cs with inactive CsCl and $M/10$ $K_4Fe(CN)_6$. Conditions as in Fig. 1a.
Fig. 1d. Electropherogram of a mixture of ^{137}Cs tracer with M/10,000 $K_4Fe(CN)_6$. Conditions as in Fig. 1a.

Solutions of caesium chloride and potassium ferrocyanide in water or dilute HCl may be mixed without forming a precipitate. When such mixtures are electrophorized in acid solution on paper, all or part of the Cs (depending on its concentration) does not move from the start. More remarkable still is that tracer quantities of ^{137}Cs

will be completely retained at the start when mixed with ferro- or ferricyanide while they move rather quickly when placed on the paper alone.

Fig. 1 shows several typical electropherograms.

We should like to offer the following explanation for this phenomenon: Caesium forms extremely insoluble double ferrocyanides with Zn and other transition metals which have been used to remove tracer Cs quantitatively from solution. Such precipitates seem to form with the traces of Cu or Zn present in the paper as impurity. A neutral soluble particle is not formed, as paper chromatography of ^{137}Cs mixed with ferrocyanide with aqueous solvents gives a spot of R_F 0.

We should like to offer this observation as it might suggest similar explanations for quite a number of "ghost spots" and "comets" encountered in paper electrophoresis.

Institut du Radium, Paris (France)

G. C. CASINOVI
M. LEDERER

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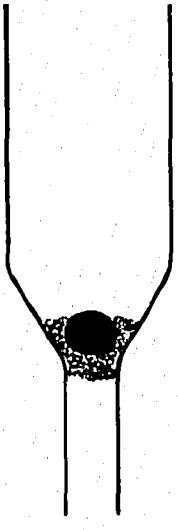
Practical method of closing small columns in column chromatography



In a study on the chlorophylls in lichens it proved to be necessary to reduce the quantity of cotton wool used to retain the adsorbent more than is allowed in the well-known methods[1,2]. A glass bead wrapped up in a thin layer of cotton wool was found to be handy. After the coated glass bead has been dropped into the tube, it is pressed down gently and the cotton wool on the top of the glass bead is "brushed" into the crevice between the tube and the glass bead (see Fig. 1).

Laboratory of Plant Physiology, University of Copenhagen (Denmark)

J. B. WILHELMSEN

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