

tic lens beta spectrometer found for the 133 and 80 keV transitions— α_K values 0.76 ± 0.15 and 1.40 ± 0.24 respectively. As the transitions involved are pure M_1 in character, these values differ from the theoretical conversion coefficients for such transitions. Zuk and Gustafsson² combining their gamma singles measurements with a scintillation spectrometer and internal conversion line intensities of Geiger *et al.*³ found for the 80 keV transition an α_K value of 1.3 ± 0.2 . Iwashita *et al.*⁴ from the gamma-gamma coincidence measurements found a value of $\alpha_K = 2.0 \pm 0.4$ for the 80 keV transition with respect to an α_K value of 5.6 for the 53 keV transition. Mangal and Trehan⁵ found for the same transition α_K value of 2.8 ± 0.6 relative to 9.4 ± 1.0 for the 53 keV transition from the coincidence spectrum gated with the 35 keV Pr-X rays. Geiger *et al.*⁶ found quite conflicting results for the K-conversion coefficient of the 53 keV transition from different measurements.

Thus the results are far from satisfactory and necessitate redetermination of these conversion coefficients. We have measured the gamma intensity of the 80 keV transition relative to the intensity of the 133 keV transition with a 2.5 cc Ge (Li) detector. The K line electron intensities for these transitions have been taken from the paper by Geiger *et al.*³ Combining the electron and gamma intensities and taking $\alpha_K(133) = 0.495$,⁷ and using the following relation:

$$\alpha_K(80) = \alpha_K(133) \frac{I_\gamma(133) I_K(80)}{I_K(133) I_\gamma(80)} \quad (1)$$

we obtain for the 80 keV transition $\alpha_K = 2.09 \pm 0.16$ which agrees well with the theoretical conversion coefficient 2.1.⁷ We conclude that the conversion coefficient is quite normal and is explained without involving any penetration effects as suggested by Mangal and Trehan.⁵

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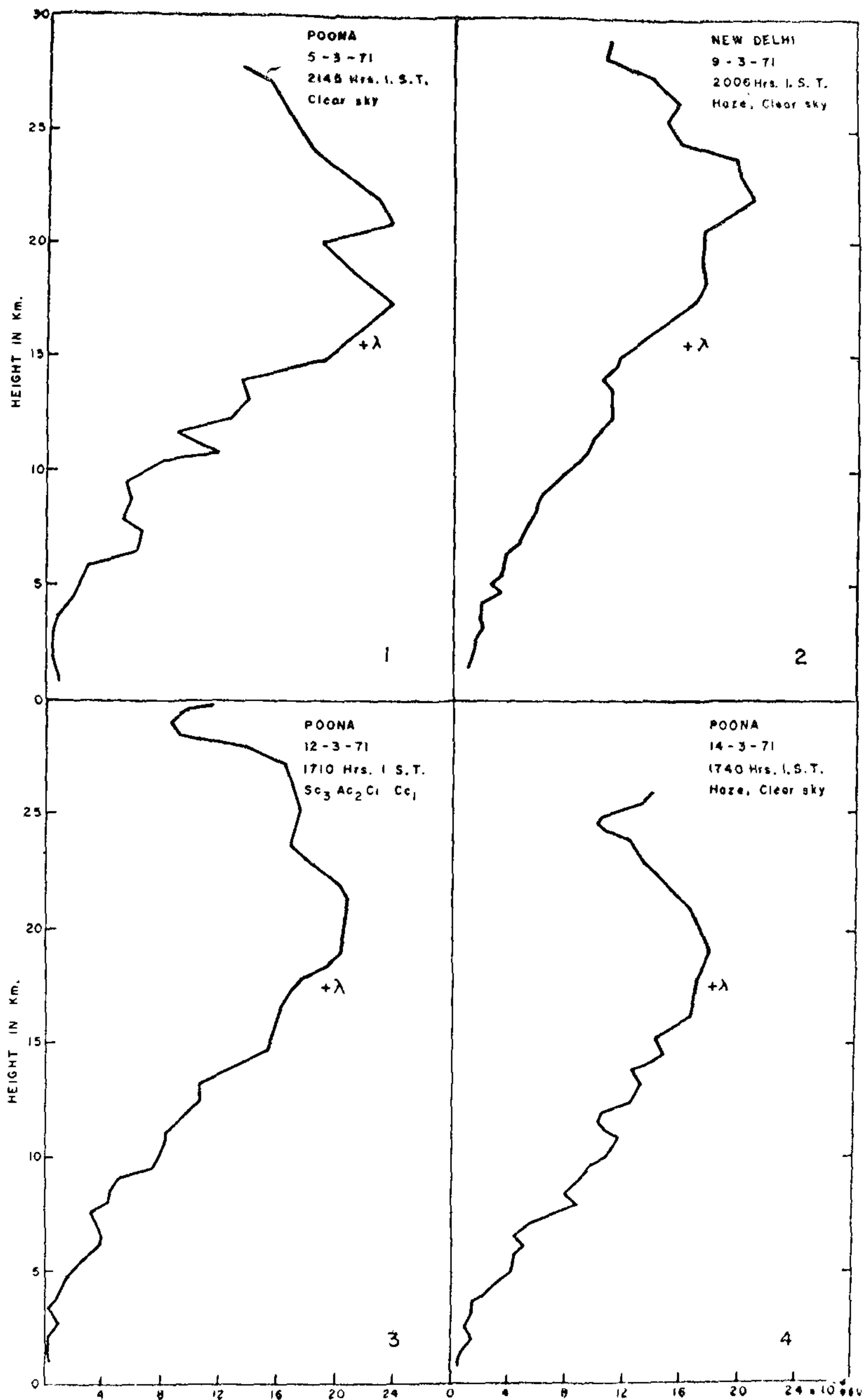
INTERESTING EVIDENCE OF STRATOSPHERIC DUST FROM ELECTRICAL CONDUCTIVITY MEASUREMENTS

SINCE 1958, a number of measurements have been made to study the nature and properties of aerosol layers in the stratosphere. Particle samples have been taken by aircraft and balloon-borne collecting devices and indirect measurements of stratospheric dust have been made using optical techniques, such as twilight sky intensity measurements, searchlight probing, laser probing, stratospheric daytime sky brightness measurements and solar extinction measurements made from rockets, satellites and balloons (Rosen, 1969).

Kroening (1960) used a different technique, viz., small ion density measurements to detect the presence of stratospheric dust. He found a large decrease from about 4×10^3 ions per cm^3 to 2×10^3 ions per cm^3 above 18 km. Similar decreases in the small ion concentration had been earlier observed by Gish and Sherman (1936) and later by Paltridge (1965, 1966).

The electrical conductivity in the stratosphere should also be affected by the presence of dust, since the conductivity is proportional to the small ion concentration. Gish and Sherman (1936) found a considerable drop in conductivity above 18 km, but this was attributed to the ozone layer and the presence of condensation nuclei at these levels. McDonald (1953) pointed out that this observed decrease in conductivity with height is supported by some earlier measurements by Idrac (1928) and urged that these be repeated using more modern sounding techniques. Stergis *et al.* (1955), Woessner *et al.* (1958) and Bourdeau *et al.* (1959) did not, however, observe any decrease in the conductivity at high altitudes that could be attributed to the effect of dust. Paltridge's (1965) measurements were made soon after the 1963 Bali eruption.

Figures 1, 3 and 4 show the vertical profiles of electrical conductivity obtained over Poona on 5, 12 and 14 March 1971, and Fig. 2 over



FIGS. 1-4

Delhi on 9 March 1971. The electrical conductivity increases with height as expected till about 18 km, when it falls sharply to about half its value, with the profile showing a series of marked minima. Above 25-28 km, the conductivity again shows a sharp increase with height. Sharp variations had been noticed in the electrical potential gradient profile in the lower stratosphere over Poona (Huddar *et al.*, 1966). These marked variations in electrical conductivity and potential gradient are presumably associated with the existence of dust layers in the lower stratosphere over India. The observed values are much lower than the theoretical values (Israel, 1970). The observations are being continued and extended using an improved conductivity sonde.

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SILVER-SILVER SELENOCYANATE ELECTRODE

SILVER halide electrodes are most commonly used as reference electrodes. The details of their preparation and use are well known.¹ Silver thiocyanate electrodes have been prepared by Parida *et al.*² and improved upon by Vanderzee and Smith.³ We have extensively used this electrode for study of SeCN^- equilibria in solution.^{4,5} In continuation of this work we have developed silver selenocyanate electrode to study SeCN^- equilibria. It is found that the thermal-electrolytic method gives the most satisfactory result in terms of reproducibility, stability and convenience of preparation.

Preparation of the Electrode.—Platinum spirals, each 1 cm long, sealed in soft glass were packed with paste of silver oxalate prepared by the method of Ferrell *et al.*⁶ They were then dried in an oven for several hours at 160-80° C and then heated in a furnace at 400° C for an hour and allowed to cool slowly. The preliminary drying period prevents sputtering during the decomposition period. Decomposition of silver oxide to spongy silver also gives satisfactory result but it is not preferable to decomposition of silver oxalate because of the tedious process of washing the oxide free from alkali after its preparation by the reaction of silver nitrate with sodium hydroxide. The silver bases were electrolysed as anodes in 0.05 M selenocyanate solution for 3 hours at 0.2 to 0.4 milliampere. Following several washings with water, they were allowed to equilibrate in a portion of cell solution for at least three days before use. These electrodes were prepared in groups of six to eight and always kept dipped in a solution of potassium selenocyanate.

Results.—It was observed that electrodes prepared in this method are reversible with respect to SeCN^- ion and can comfortably be used to estimate the ion potentiometrically. Figure 1 shows a typical potentiometric titra-

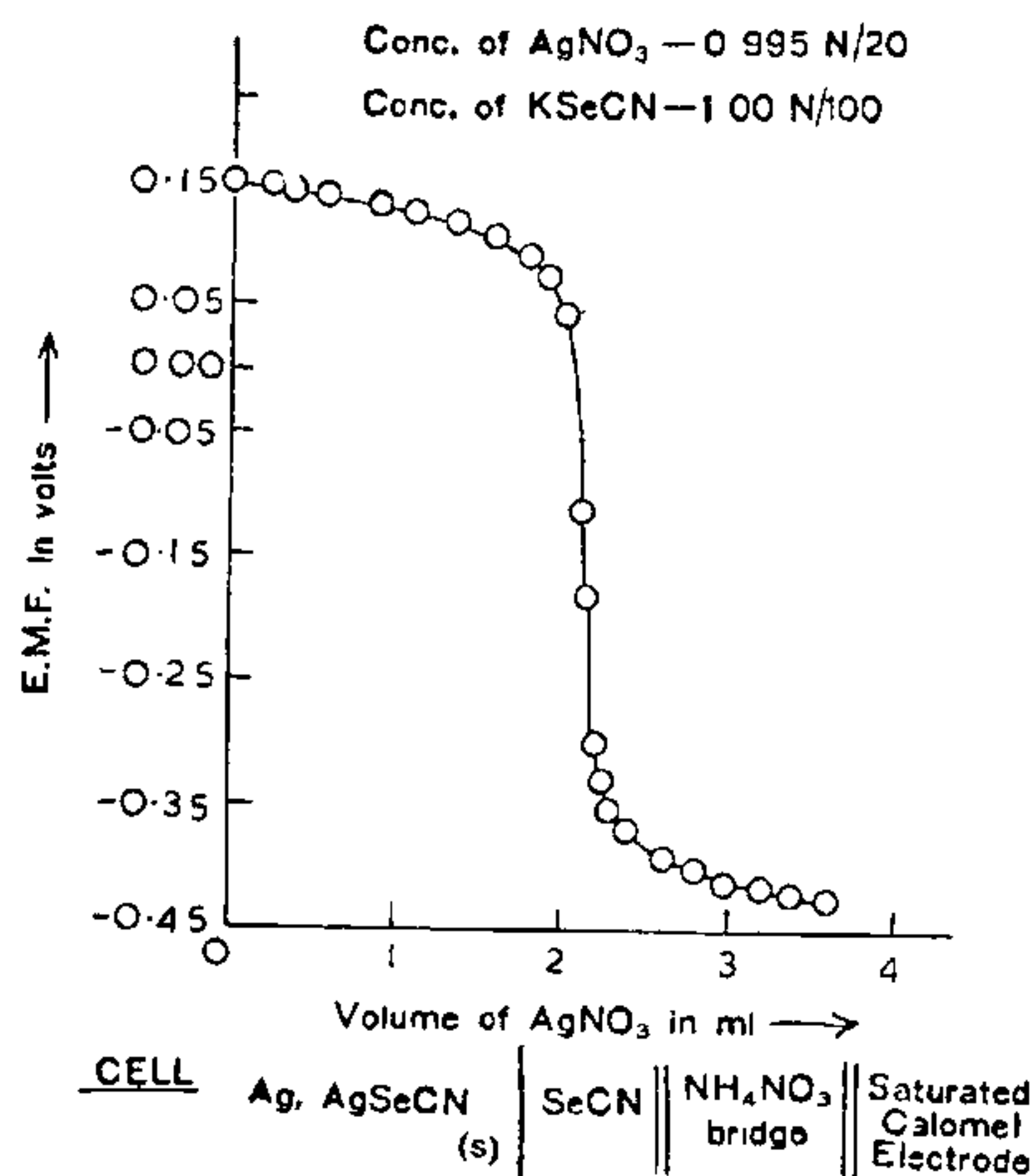


FIG. 1

tion curve and Table I gives the results of different titration curves. Presence of an in-