chain (II) terminates the latter due to the steric hindrance to any further step[9,10].

The terminated chain in II can start another chain by proton transfer, thus permitting an original initiation process to cause the same total amount of polymerization with and without di-*iso*butene but giving lower molecular weights in its presence.

We are informed by A. G. Evans and G. W. Meadows that they have established the occurrence of a high degree of chain transfer for the reaction of *iso*butene in the presence of boron trifluoride–cocatalyst complexes. Their results have been submitted for publication elsewhere[11].

C. HORREX

Department of Chemistry,
University, St. Andrews.

F. T. PERKINS

Department of Chemistry,
University, Manchester 13.
Sept. 22.

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## Streaming Potential in Paper Chromatography

THE net resultant flow of solvent through the capillary channels of paper used in chromatography is in a direction away from the point of feed, and it was therefore considered possible that such a system might result in the setting up of a streaming potential[1].

This has been verified experimentally in some cases, using water and inorganic salt solutions: distilled water flowing through a washed and dried strip of No. 3 Whatman paper showed a potential gradient of approximately 10 mV. per cm. measured by a Cambridge *p*H meter. With 1 per cent thorium nitrate solution in place of water, the potential was reduced almost to zero. 1 per cent sodium chloride solution showed a potential gradient of approximately 4 mV. per cm. Various factors, such as rate of flow of liquid, and nature of electrodes used in making the measurements, may affect the values considerably.

Such potentials (or their causes) may well exert a marked effect on the process of chromatographic development, and preliminary experiments in which the potentials have varied have given interesting indications. For example, development of 0·01 ml. of 0·1 per cent aqueous solution of a mixed colour (Edicol Green 37113, I.C.I., Ltd.) with distilled water failed to separate the components, the band moving with the solvent front, whereas development with 1 per cent sodium chloride solution achieved complete separation into blue and yellow bands. Very dilute solutions of aluminium chloride and thorium nitrate caused strong adsorption of both components, which is difficult to attribute to 'salting out' effects[2] in view of the low salt concentrations, and more probably relates to changes in the electric double layer.

Indications have been observed using either the strip or central feed technique[3] that the flow of one liquid over another occurring in 'partition' chromatography may result in streaming potentials of varying sign, which may be significant in considering possible mechanisms of 'partition' separations.

A study of the above and related phenomena is in progress and will be reported more fully elsewhere.

L. RUTTER

Sir John Cass Technical Institute,
London, E.C.3.
Nov. 12.

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## Dielectric Properties of the Human Body in the Microwave Region of the Spectrum

As a preliminary to a detailed study of the reactions of certain body tissues to electromagnetic radiations on centimetre wave-lengths, it has been found desirable to determine the propagation characteristics of such waves in various parts of the body.

The specimens were obtained in most cases from surgical operations, being selected for homogeneity and cut into sections suitable for insertion in a waveguide cell. In this cell the specimen was trapped between a tight-fitting plug of polystyrene one half wave-length in thickness and a reflecting metal plunger driven on a micrometer screw thread. The cell was surrounded by a bath of water thermostatically controlled at a temperature of 37° C. to an accuracy of $\pm \frac{1}{2}$° C.

From measurements on the standing wave pattern set up in the wave-guide feeding the cell, two constants $\alpha$ and $\beta$ for the medium were determined by a method similar to that used by Roberts and von Hippel[1]. The parameter $\alpha$ is the absorption coefficient and is expressed in nepers/cm. The parameter $\beta$ is the phase constant expressed in radians/cm. and is a measure of the velocity of the wave in the medium. To a first approximation the dielectric constant of the medium can be taken as proportional to $\beta^2$.

The following representative body constituents have been measured in this way at a wave-length of 3 cm., several thicknesses from various specimens being used where practicable (Table 1).

The results quoted in Table 1 should have a measurement accuracy better than $\pm$ 5 per cent in $\alpha$ and $\pm$ 1 per cent in $\beta$; but the difficulty of repeating biological specimens accurately should be appreciated. Measured in the same equipment, the corresponding constants for distilled water at 37° C. were $\alpha = 2{\cdot}70$ and $\beta = 16{\cdot}0$, which are in good agreement with those obtained by Collie, Hasted and Ritson[2].

Examination of the results for biological materials leads to the following general conclusions.

(1) The absorption coefficients at 3·18-cm. wave-length for a large number of body constituents are substantially the same as that of water at the same temperature. Fatty tissue and bone have a considerably lower absorption, and are relatively transparent to the radiation.

(2) The phase constants for a large number of body constituents fall into a group with a rather lower average value than that of water. Small, but significant, differences occur within the group, presumably attributable to the variation of water content. This is demonstrated by results taken on