between the observed and the calculated intensities was sufficiently good to afford confirmation of the correctness of these values. Interatomic distances calculated from these adopted atomic parameters suggests a regular distribution of the silver and the cadmium atoms, silver atoms occupying positions of *B* atoms and *C* atoms, cadmium atoms those of *A* atoms and *D* atoms.

Our calculations were based on powder photographs and the data of reflections made available to us by Prof. A. Westgren of the University of Stockholm. A detailed account of them will be published in the *Acta et Commentationes Universitatis Tartuenssis*.

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Cataphoretic Measurements on Solutions of Visual Purple and Indicator Yellow

LIGHT transforms visual purple, the substance responsible for scotopic vision, into a yellow compound, the colour of which depends on pH ('indicator yellow'). Visual purple behaves as a coloured protein, that is, it is a 'chromoprotein'. Experiments have been carried out to see if a shift of the isoelectric point occurs on bleaching.

The visual purple was obtained from Hungarian frogs by means of extraction with digitonin, and the solution dialysed for long enough to remove the bulk of the salts, but not to precipitate the protein. Measurements were made with a micro-cataphoretic cell which will be described elsewhere. Quartz particles of the size 2–5 μ were suspended in the solution and *N*/100 acetate buffer added. The particles adsorb the chromoprotein and their movement is governed by the ionization of the latter². The measurements on visual purple were carried out in ruby light to prevent bleaching. After each determination, white light was switched on without removing the cell, so transforming the visual purple into indicator yellow. During the bleaching the cataphoretic velocity of the particles increased in

solutions more acid than about pH 4.5, and decreased in solutions more alkaline than pH 4.5. After a few minutes a steady velocity was reached, which was independent of whether observation was made with ruby or white light.

The cataphoretic velocities before and after bleaching for one preparation are plotted against pH in the accompanying graph. It appears that the isoelectric point of the particles in the visual purple solution is 4.47, and in the indicator yellow solution 4.57 pH units. Other preparations gave the same type of curves and the same shift on bleaching, but sometimes the positions of the isoelectric points were slightly different (± 0.1). The isoelectric points are, therefore, in a comparatively strongly acid range. This explains the observation that solutions of visual purple become acid on prolonged dialysis against distilled water³.

No other case appears to be recorded in literature where moderate illumination produces a change in the isoelectric point of a protein or chromoprotein. The bleaching process of visual purple is apparently associated with an increase in the number of alkaline groups, such as NH_2 , available for ionization.

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THE VARIATION OF THE CATAPHORETIC VELOCITIES IN SOLUTIONS OF VISUAL PURPLE AND INDICATOR YELLOW WITH pH VALUE

A Mechanism for the Concentrating of Potassium by Cells, with Experimental Verification for Muscle

THE membrane considered is one of special type, with cation and anion pores, permeable to potassium but not to larger sodium ions, and permeable at the same time to small anions of the type of chloride, bicarbonate, phosphate, etc., but not to larger anions such as hexose esters, phosphocreatine, etc. The concentrations inside (or within the cell) and outside the membrane are represented as follows: B/V and b , impermeable cations; k_1 and k , potassium; d_1 and d , permeable anions; A/V , impermeable non-colloidal anions; C/V , colloidal anions inside; x , external impermeable non-electrolyte such as glucose.

The permeable anions, which will be almost entirely chloride and bicarbonate, are considered as monovalent, and the valencies of B , A and C are written as m , n and p . V is the volume of the solvent inside, which is considered to be initially one litre. The quantities A , B and C are regarded as independent of V . The total external concentration is written as ' c '.

From the requirements of the osmotic, electrical and Donnan equilibria we may deduce the following equations:

$$V^2(c^2 - 4kd) - 2VKc + (K^2 - K_1^2) = 0 \quad (1)$$

$$2k_1 = c - (K - K_1)/V \quad (2)$$

$$kd = k_1d_1 \quad (3)$$

$$K = B + A \quad (4)$$

$$\text{and } K_1 = nA + pC - mB \quad (5)$$

Reckoning the value of $(K - K_1)$ from the available data, it is found to be sufficiently small to be neglected