Although measurements are complicated by concentration changes in the paper resulting from evaporation, condensation, or electroosmosis while equilibrium is being reached, preliminary experiments indicate that a power level of less than 0.001 w/cm^2 is permissible. This corresponds to a field strength of less than 3 v/cm. In practice it is difficult to determine the exact power level for equilibrium; and unless accurately standardized conditions and low voltages are used, the glycerol concentration will change during the run. At normal levels of operation in hanging-strip apparatus, most of the heat generated in the paper is carried away by evaporation, as I have stated; the addition of glycerol increases slightly the proportion of heat removed by other routes—that is, conduction, convection, and radiation.

These complications are completely avoided in the pressure-plate type of apparatus, where the vapor space is entirely eliminated and the paper is in good thermal contact with thermostatted cooling plates. For good results a constant pressure must be maintained on the paper; apparatus for doing this will be described in a separate publication.

Most workers in this field recognize that specific identifying tests applied to the completely separated fractions obtainable in paper electrophoresis make "absolute" mobility determinations unnecessary. Useful mobilities can be obtained by applying various empirical corrections.

I hope my note did not mislead anyone into thinking that horizontal paper-strip apparatus is unsuitable for electrophoresis work. Indeed, as the designer of such an apparatus, I prefer it to other types. I must add, however, that in my opinion the pressure plate is an essential element of the design.

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Lattice Constants of Pure and Fluoride-Contaminated Ice

X-ray measurements have been performed to obtain precise values for the unit cell dimensions of pure and fluoride-contaminated ice. A new c/a ratio is calculated for pure ice, and in the case of fluoride-contaminated ice evidence is found that this impurity enters into the ice structure substitutionally. The latter finding is important in connection with the mechanism of electric conductivity in fluoride-contaminated ice, since it has been shown that presence of traces of fluoride ions almost completely determines the electric conductivity (*1, 2*).

The lattice constants of pure and fluoride-contaminated ice were determined by the use of a symmetrical back-reflection focusing camera designed specifically for use on ice. The diameter of the camera was 17 cm, and the area of the irradiated sample was 24 mm^2. Copper K_α radiation was used with an exposure time of 12 hr at 17 ma and 40 kv. The sample temperature during the time of exposure was -46.0 ± 0.7°C. The Miller indexes of the back-reflection lines were determined by the graphical method of Bjurström (*3*), and the procedures of calculation followed Jette and Foote (*4*).

The lattice constants of pure ice (prepared from water having a specific conductivity of 2.5×10^{-7} mho/cm at 20°C) were measured at -46°C giving the values: $a = 4.507_1 \pm 0.000_5$ A and $c = 7.332_7 \pm 0.000_9$ A. In the case of fluoride-contaminated ice (frozen from $4.5 \times 10^{-4}M$ CsF), the dimension of the cell base was found to be the same as that for pure ice, but the cell height was 0.033 ± 0.025 percent shorter. Since only the fluoride ion is incorporated (*1*) and considering the properties of this ion, one would expect a slight shortening of the lattice if the impurity enters substitutionally. On the other hand, the amount of fluoride used would be expected to produce a detectable expansion of the lattice if it were incorporated interstitially. The fact that the fluoride impurity did not *increase* the unit cell dimensions gives evidence that this impurity enters into the ice structure substitutionally rather than interstitially.

The afore-mentioned values for the lattice constants of pure ice agree fairly well with the values obtained by H. D. Megaw (*5*). The slight difference that does exist between Megaw's values and the values stated here for pure ice leads to a new value for the c/a ratio of 1.627 at -46°C as opposed to the ideal value of 1.633. The present determination of the c/a ratio for pure ice further substantiates Bjerrum's argument concerning preferred dipole orientation (*6*).

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Think like a man of action and act like a man of thought.—HENRI BERGSON.