effect, gave definite indications of an inhomogeneity with respect to molecular size. Similar experiments with zein fractions gave sedimentation constants (corrected to the basis of sedimentation in pure water at 20° C.) which varied between $1\cdot5$ and $3\cdot5\times10^{-13}$ cm./sec., with corresponding diffusion constants between $5\cdot2$ and $2\cdot6\times10^{-7}$ cm.²/sec., depending upon the fraction used. The constituent which is present in greatest concentration and forms about sixty per cent of the normal zein has a sedimentation constant of $1\cdot9\times10^{-13}$ cm./sec., diffusion constant $4\cdot0\times10^{7}$ cm.²/sec., and therefore molecular weight in the neighbourhood of 35,000. The molecular weight of the light constituent is approximately one half this value.

Sedimentation velocity studies were also made with zein and zein fractions dissolved in 50 per cent aqueous urea solution to which electrolyte has been added, with results in agreement with those found in the alcoholic solutions. The particles behave as if they were rod-like in character.

Four series of measurements were made of the electrophoresis of zein. In each case the solute was a fractionated product and the solvent was an acetate or phosphate buffer made up in 60 per cent alcohol solution. In the case of three of the fractions, some non-uniformity of migration was clearly visible, indicating that our choice of the limits of alcohol concentration for the fractionation might have been improved upon. In the fourth instance, the fraction corresponded quite closely to the light constituent and the migration was more uniform. With the use of the mobility data the isoelectric point of zein was found to range between *p*H 5 and 6. The isoelectric point of the main constituent is *p*H $5\cdot6\pm0\cdot1$, that of the lighter fraction $0\cdot3$ *p*H unit higher. The critical precipitation limit for unfractionated zein was found to be in the neighbourhood of *p*H $5\cdot4$.

The results of our dielectric constant experiments, performed at about 20° C., are of interest in connexion with the homogeneity and size of the dissolved units. Measurements were made with dilute solutions of four different preparations of dialysed zein in aqueous ethyl alcohol at a number of wave-lengths between 25 metres and 1,000 metres. For the most part, the data are consistent with interpolated figures from earlier observations made over a smaller wave-length range[1]. These data pertain to *n*-propyl alcohol solutions of higher zein concentration. The dielectric constant – frequency curves again characterise the unfractionated zein as polydisperse in character.

Calculated as an *average*, the data require a time of relaxation, $\tau=3\cdot5\times10^{-8}$ sec. This is a figure corrected to the basis of an orientation in pure water and it was obtained by a method which differs from that used by Wyman in that only the viscosities of solvents are involved. By making use of the formula which permits the calculation of the molecular weight of a spherical particle from the values of the time constant[2], there is obtained the approximate result 40,000. This molecular weight corresponds quite closely to the weight one would calculate by combining weighted average values of the sedimentation and diffusion constant given above. This agreement may be accounted for, at least in part, if it may be assumed that the motion of the zein in the electrical field is a rotation around the long, rather than about the short axis[3].

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Determination of Surface Tension by the Drop-Weight Method

WHEN surface tension is determined by the drop-weight method, the drops must be allowed to fall as nearly as possible under the influence of gravity alone. In practice, the time of formation of a drop should be not less than five minutes[1].

The essential part of the apparatus is a vessel (containing the liquid under investigation) which terminates in a capillary tube with a carefully ground and accurately calibrated tip. If the height of liquid in the vessel is considerable, the drops tend to form too rapidly for accuracy. If the height is small, the time of formation in the case of a viscous liquid may be so great as to render the experiment very tedious. A device which would enable the operator to force the drop out quickly until it was almost fully formed, and would then permit the formation to complete itself and the drop to fall under very small pressure, would obviously be a convenience. Several such devices, most of them elaborate, have been proposed, and the object of this letter is to suggest one which has the merit of extreme simplicity.

In a paper by E. L. Harrington[2], we find a description of the 'rotette', "an apparatus for handling small quantities of liquids with rapidity and precision". In the 'rotette', a spiral glass tube (such as is used in a spiral condenser), containing a small amount of mercury, is mounted horizontally and attached by a flexible connexion to a pipette. When the spiral is rotated, the movement of the mercury causes an increase or reduction of pressure in the pipette.

For application to surface tension measurements, the spiral tube with its mercury bead should be attached to a *T*-tube, a second arm of which is connected to a manometer, and the third to the stalagmometer. If the liquid under examination is viscous, a known pressure can be applied by rotating the spiral, and the drop will form rapidly. When drop formation is almost complete, the spiral is rotated in the opposite direction, until the reduction in pressure is sufficient to counterbalance almost exactly the pressure of the liquid in the stalagmometer. The final fall of the drop will then be under the influence of gravity alone. If the liquid has a low viscosity, the pressure may be reduced from the start to secure a reasonable time of drop formation.

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