before and after thawing gave ratio 64 to 1, and on one fine grass blade the ice weighed 197 times the grass.

The whole appearance of the countryside was fantastic and grotesque, and it would be interesting to know if any previous similar occurrence is on record.

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Optical Anisotropy of Cellulosic Sheets

THE following observations on the optical anisotropy of cellulose ester sheets may supplement the findings of Drummond[1].

Whether the 'slow ray' in the plane of the sheet is normal to, or coincident with, the direction of stress depends on the hydroxyl content of the ester, and, to a lesser extent, on the solvent content of the sheet when stress is applied.

Increasing hydroxyl content favours the same direction as that of the stress, whereas, as surmised by Drummond, introduction of acyl groups favours the normal direction. Thus, with cellulose acetates, the acetyl contents of which are greater than 43 per cent, the slow ray direction may be normal to the direction of stress; similar behaviour is also shown by cellulose nitrate sheets.

Within a certain range of hydroxyl contents, in acetate and in nitrate sheets the amount of solvent or imbibed liquid when tension is applied may influence the position of the slow ray. In general, the slow ray lies normal to the direction of stress if tension is applied to a sheet which contains a large proportion of solvent, whereas removal of the latter favours its location in the direction of the applied stress.

The extrapolation of birefringence values of cellulose ester sheets to zero acetyl content by Drummond finds some justification from measurements made on uniaxial cellulose acetate sheets, where the increase in negative birefringence is approximately linear with a decrease from 44·8 to 27·0 per cent acetyl. This is more strictly the case in the triacetate region, provided a solvent is selected which gives relatively flexible sheets, and that esters of similar chain-length are employed. As might be anticipated, increase of chain-length increases the negative birefringence.

A detailed discussion of these results will be published elsewhere.

It may be opportune to emphasize here that this method of sheet birefringence determination[2] in its more accurate form is restricted to sheets of relatively low values of birefringence such as those which lie beyond the sensitivity of immersion methods. The method is essentially an approximation in two respects, first, in the assumption of identity of path of the two components in transmission through the sheet, and secondly, in the inherent approximation of the graphical extrapolation.

JOHN SPENCE.

Research Laboratories,
Eastman Kodak Company,
Rochester, N.Y. Feb. 15.

[1] Drummond, D. G., NATURE, **145**, 67 (1940).
[2] Spence, J., *J. Phys. Chem.*, **43**, 865 (1939).

Structure of Cellulose Acetate

RECENTLY I have examined several samples of cast plasticized secondary cellulose acetate sheet material under the microscope. With crossed nicols a uniform yellow polarization colour was shown, indicating a considerable amount of orientation. Taking the casting flow-lines, parallel to the 'selvedge' edge, as the direction of the *c* axis, the samples showed oblique extinction. This phenomenon is consistent with the view that the cellulose acetate unit, and also the parent cellulose, is monoclinic rather than orthorhombic.

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Points from Foregoing Letters

L. Jánossy and P. Ingleby have carried out counter experiments which give evidence for the occurrence of penetrating showers distinctly different from cascades or knock-on showers. Parts of the showers may possibly be accounted for by assuming the creation of mesons in lead.

Mechanical pressure on the eye causes temporary blindness through retinal anoxæmia. K. J. W. Craik finds that after-images of a light exposed to the eye in this condition can be seen on releasing the pressure. This appears to demonstrate their retinal origin, since the stimulation from the primary image has never reached the visual centres in the brain.

In a reply by F. Dickens to a recent comment by Boyland, it is pointed out that although the association of a lowered respiratory quotient with a strong aerobic glycolysis is no longer considered as strictly specific to tumour metabolism, the occurrence among normal tissues of this combination is exceptional enough for it to remain the most characteristic of the known biochemical features of cancer. Dr. Boyland replies that, in his opinion, as this combination does recur in some cases, it is undesirable to say that tumours differ from non-malignant tissues in these properties.

Using enzyme preparations obtained from the electric organ of Torpedo, D. Nachmansohn finds that choline esterase is only active in the presence of divalent cations. Monovalent cations will reactivate the enzyme, but only at very high concentrations.

J. Spence points out, in regard to the anisotropy of cellulose sheets, that the hydroxyl content of the cellulose ester and the solvent content of the sheet influence the orientation of the slow ray in the plane of the stressed sheet. Uniaxial cellulose acetate sheets show, within limits, a linear increase in negative birefringence with increasing hydroxyl content.