

the larger drop, and coalescence is unlikely both for impact of small drops and for large drops with small ones. In this connexion it is of interest to record that when a large drop was formed in the experiments, it plunged through the chamber scattering the smaller ones in its path.

I am indebted to the director of the Meteorological Office for permission to communicate this letter.

W. C. SWINBANK

Meteorological Office, Air Ministry,
Dunstable, Bedfordshire.
April 15.

Silver Chloride Plates for Infra-Red Spectroscopy

ALTHOUGH rock salt has been commonly used in the construction of absorption cells for infra-red spectroscopy, it has the inherent disadvantages of being opaque beyond $15\ \mu$, and of being attacked by water. Silver chloride, however, is transparent up to $25\ \mu$ and is completely resistant to water.

Fugassi and McKinney¹ have briefly described a method for making silver chloride plates by rolling the fused material. Difficulties were encountered in rolling and casting when trying to repeat this work. Silver chloride plates of suitable quality, however, were prepared in this laboratory by the following method.

All operations were carried out in a darkened room lit by a 40-watt bulb. Silver chloride was precipitated from silver nitrate and sodium chloride, taking care that as little silver nitrate as possible was occluded in the precipitate. The latter was filtered off and dried at 105°C . A piece of porous porcelain (2 in. \times 2 in. \times $\frac{1}{8}$ in.) was heated to redness over a Bunsen burner, and a few grams of the dry silver chloride melted on (melting point AgCl , 455°C). The orange liquid was spread out in a layer about $\frac{1}{2}$ -mm. thick, and any scum scraped to the side using a second piece of porcelain. When cold, the sea-green layer was covered with a film of nitrocellulose lacquer and the whole immersed in a 20 per cent solution of sodium thiosulphate for 15–20 min., after which time the opalescent silver chloride layer could be peeled off the porcelain.

After washing the silver chloride in acetone, it was pressed between polished stainless steel disks in a steam-heated press at 4 tons per square inch for 2-min. periods. The plates so produced were stood in gaseous chlorine for a number of hours, in order to ensure complete clarity, and then repressed.

This method provides silver chloride plates about $\frac{1}{4}$ -mm. thick, transmitting uniformly 65 per cent of the incident radiation between $5\ \mu$ and $15\ \mu$ —the region studied. They are rigid and tough and suitable for the construction of absorption cells, and are only slowly darkened on exposure to daylight. Artificial light had no detectable influence on the plates over a period of four weeks.

Kremers² has described a method, based on a silver sulphide coating, of protecting silver chloride plates against solarization.

K. S. TETLOW

Research Department,
I.C.I. Ltd., Explosives Division,
Stevenston, Ayrshire.
April 7.

¹ Fugassi and McKinney, *Rev. Sci. Instr.*, **13**, 335 (1942).

² Kremers, *J. Opt. Soc. Amer.*, **35**, 349 (1946). See also Fuoss, *Rev. Sci. Instr.*, **16**, 154 (1945).

Distortion of Fungal Hyphae in the Presence of Certain Inhibitors

Brian, Curtis and Hemming¹ have recently reported the production by *Penicillium Janczewskii* of a factor having little antibiotic action but causing characteristic distortion of fungal hyphae growing in its presence. This substance, isolated in a crystalline state and given the formula $\text{C}_{20}\text{H}_{20}\text{O}_9$ ², has been termed 'curling factor'. The description and illustrations of the stunting and curling caused by this factor are strongly reminiscent of the appearance of hyphal tips growing in the presence of a number of relatively simple inhibitory substances (notably methyl *p*-hydroxybenzoate³) encountered by me during the course of fungistatic investigations using *Aspergillus niger*, *Penicillium roqueforti* and *Byssoschlamys fulva*. Brian, Curtis and Hemming, while referring to earlier records of similar morphological effects caused by the metabolic products of organisms, consider their effect to be distinct from any previously described for pure chemicals. I consider that the behaviour of the esters referred to above is likely to come into the same class of phenomenon as claimed for 'curling factor'.

My investigations have involved hyphae growing on Czapek's agar (pH 4–5; nitrogen as nitrate), and, although records of distortion have been incidental to the principal purpose of the work, certain aspects seem to merit comment. The appearance of affected hyphae is most characteristic, involving stunting, multiple branching and curling in a peculiar zigzag form. That the phenomenon is not directly associated with the inhibitory action of the substance is seen in a comparison of homologous esters, where increasing chain-length, although markedly increasing fungistatic activity⁴, does not proportionately enhance the distortion effect. On the basis of concentration of ester causing a given level of inhibition, the lowest esters, notably methyl, cause much greater distortion. As a result, little, if any, curling of hyphae is to be seen with those concentrations of higher esters (such as butyl to heptyl) that are low enough to permit growth. Distortion has also been observed for anisic, salicylic and benzoic acids and for phenol; with *p*-hydroxybenzoic acid itself and the *m*-isomer, the effect is either small or absent.

It is of interest to examine the quantitative nature of the relationship. Brian *et al.* have found their 'curling factor' to be remarkably active, permitting marked stunting at 6×10^{-6} molar. In contrast, the molar concentration of methyl *p*-hydroxybenzoate, permitting ready detection of the similar effect with *A. niger*, is of the order 300×10^{-6} —still very much less, however, than that required for the complete inhibition of growth (approx. $3,000 \times 10^{-6}$). It is, of course, possible that distortion results not directly from the action of the inhibitor but from a product of the mould's own metabolism with inhibitor serving as precursor. If this were so, the concentration of such a factor might well be very much less than that of the inhibitor initially supplied.

J. M. VINCENT

School of Agriculture,
University of Sydney.
March 19.

¹ Brian, P. W., Curtis, P. J., and Hemming, H. G., *Trans. Brit. Mycol. Soc.*, **29**, 173 (1946).

² McGowan, J. C., *Trans. Brit. Mycol. Soc.*, **29**, 188 (1946).

³ Vincent, J. M., *J. Soc. Chem. Ind.*, in the press.

⁴ Cavill, G. W. K., and Vincent, J. M., *J. Soc. Chem. Ind.*, in the press.