

$a = 6.85 \text{ \AA}$, $c = 6.64 \text{ \AA}$, and an axial ratio $a : c$ of 1.032. Allowing for the presence of a small amount of a phosphate mineral in the concentrate analysed, this cell contains close to $3(\text{Ln,Ca})\text{BSiO}_3$ for the measured density of 4.57 gm./c.c.

The mineral is named in honour of Dr. Frank Leslie Stillwell, former chief of the C.S.I.R.O. Mineragraphic Investigations, who has contributed so notably to the knowledge of Australian ore deposits and who initiated the study of ore minerals in Australia.

A detailed report will be published elsewhere.

From another source, the discovery of a "boron-bearing variety of cerite" in Mary Kathleen ore was announced in the *Adelaide News* of May 20, 1955.

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¹ McAndrew, J., C.S.I.R.O., Mineragraphic Investigations Report 604 (1954).

Plasticity of Wool

THE marked variations in plasticity among the fibres of a single staple of wool¹ are now known to be associated with the types of follicle from which they are derived, fibres with the lowest plasticity being produced by primary central follicles, which are the first to develop, and fibres with the highest plasticity by the secondary follicles which are the last to develop². It has, however, proved more difficult to identify the chemical and physical causes of the variations in plasticity. With two wools, which were examined in great detail, fibres with the lowest plasticity were found to have the highest sulphur content, and vice versa^{1,3}, as would be expected if unfolding of the main chains of α -keratin during plastic flow is impeded by cystine cross-linkages; but the simplicity of the relationship appears to be marred in other cases by differences in the mode of distribution of cystine in different fibres.

A rule of more general validity has, however, emerged from studies of the relationship between the plasticity of fibres and the proportion of ordered (crystalline) material they contain. The observation that there is an inverse relationship between plasticity and crystallinity in the case of New Zealand Lincoln wool³ has now been confirmed with a wide range of New Zealand Romney, Australian merino and South African merino wools. Not only so, but also the physical and chemical causes of variations in plasticity among the fibres of a single staple appear to be linked, as is shown by the following determinations of the plasticity and tyrosine content of fibres from single staples of two New Zealand Romney wools.

Fibres from primary lateral follicles (early curly-tips) and secondary follicles (long histerotrichs) were selected from a single staple in the usual way². Each fibre was allowed to extend about 55 per cent in water at 22.2° C. under a load of 700 kgm./cm.². On being released, the fibre returned to its original length, and its plasticity (k) was calculated from the extension/time curve¹. The eight early curly-tips with the lowest plasticities and the eight histerotrichs with the highest plasticities were then iodinated with iodine-131 under conditions which are known to con-

vert almost all (96 per cent) of the tyrosine side-chains into 3:5-di-iodotyrosine⁴. After the fibres had been freed from loosely combined iodine by treatment with sodium thiosulphate solution and washing, radiophotographs were prepared in the usual way⁴. The tyrosine content of each fibre was then estimated by measuring the optical density of the radiophotograph at intervals along the length and correcting for the variations in cross-sectional area of the fibre. The results are given in Table 1.

Table 1

Wool No.	Type of fibre	Average diameter (μ)	Average plasticity, ($k \times 10^{-3}$)	Tyrosine content (arbitrary units)
1	Early curly-tips	40.7	28.7	6.4
	Long histerotrichs	28.8	67.6	10.9
2	Early curly-tips	39.0	49.7	6.1
	Long histerotrichs	28.4	77.9	9.0

In both cases the more plastic fibres contain the greater amount of tyrosine, and since the more plastic fibres are also the more amorphous, it seems clear that the bulky side-chains of tyrosine are one cause of main-chain disorder in wool, just as in the case of silk.

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¹ Ripa, O., and Speakman, J. B., *Text. Res. J.*, **21**, 215 (1951).

² Burley, R. W., and Speakman, J. B., *Text. Res. J.*, **23**, 702 (1953).

³ Burley, R. W., Nicholls, C. H., and Speakman, J. B., *J. Text. Inst.*, **47**, T427 (1955).

⁴ Richards, H. R., and Speakman, J. B., *J. Soc. Dyers and Colourists*, **71** (1955).

Theory of Antibiotic Inhibition Zones in Agar Media

SINCE Cooper and Woodman¹ proposed on theoretical grounds that the formula

$$x^2 = 4DT_0 \cdot 2.30 (\log m_0 - \log m')$$

should explain the size of inhibition zones, under specified experimental conditions, evidence on the validity of this proposal has been accumulated by many workers. The variables in the formula have been further analysed, and it is now possible to give an extended explanation of their meaning, which should give a more accurate understanding of the factors influencing the size of inhibition zones.

The original formula was concerned with the diffusion of an antibiotic having a diffusion coefficient D , from a solution kept at a constant concentration m_0 , into an agar culture of an organism (Fig. 1).

The time at which the critical concentration m' reached the edge of the zone of inhibition can be

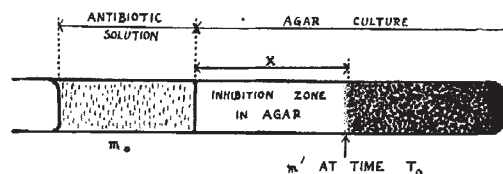


Fig. 1