The following values of percentage polarization were obtained: in the brightest part of the coma, 41 ± 5 per cent; in the inner tail, at a point 4 min. of arc from the coma, 51 ± 5 per cent, and at a point 5 min. of arc distant, 35 per cent, with the plane of polarization along the radius vector to the Sun.

Because of under-exposure, the total density in the image of the tail recorded through the 'crossed' analyser equalled the threshold (sky background) value at an angular distance of only 7 min. of arc from the bright, central region of the coma. Thus the probable error of the third measurement given above is uncertain and, in consequence, this result should have less weight than the other two.

The amount of polarization found in the head of the comet agrees well with the value of 45 per cent obtained on an unspecified date by Richter[1], who also used a polarizing filter. However, it is nearly 20 per cent higher than the maximum polarization found by Blackwell and Willstrop[2] in the continuous spectrum of the comet.

Richter (*loc cit.*) has reported that the comet's tail was also 45 per cent polarized out to a distance of 4° from the head. The present results suggest that this value may even be exceeded at the base of the tail near its junction with the coma.

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[1] *The Observatory*, 77, 131 (1957).
[2] *Mon. Not. Roy. Astro. Soc.*, 117, 590 (1957).

The α-β Transformation in Keratin

The possibility of obtaining from X-ray diffraction results a quantitative estimate of the course of the α–β transformation as a keratin specimen is stretched is so important that attempts such as that of Bendit[1] are to be welcomed. I feel, however, that it is impossible to say the same about the proposal recently put forward by V. D. Gupta[2], who measures for specimens at various extensions the value of an index

$$\Omega = \frac{I_e - I_m}{I_e + I_m} \times 100$$

which he wishes to take as a measure of what he calls the "degree of order". So far as can be gathered from his somewhat ambiguous phraseology, the quantities I_m and I_e are the intensities of the meridional and equatorial diffraction spots, the former the group of reflexions with spacings near 5·1 A., and the latter the reflexions with spacings near 10 A. (common to the α- and β-photographs) and near 4·65 A. (characteristic of the β-photograph). If this interpretation of Gupta's intentions is correct, then changes in Ω are indications not so much of changes in the degree of order (whatever this might mean) as of changes in the β : α ratio. His conclusion that during stretching there is an initial rapid rise in the degree of order, with little further change at extensions greater than 40 per cent, should therefore be replaced by the almost trivial result (it was not so trivial 30 years ago) that the X-ray photograph at 40 per cent extension is more like that at 70 per cent extension than it is like that of unstretched fibres.

To talk about "degree of order" in a material like keratin, with its potentialities for changes of crystal structure, state of crystallite orientation, and crystallinity ratio, without making it quite clear whether some or all of these or some other unspecified characteristic of the material is involved, is, we consider, dangerous and misleading. If, for example, we agree to measure lack of order by the entropy, experiments on the elastic properties[3] indicate that in the initial stages of extension there is a *decrease* in the degree of order; I think that this is confirmed when the results of X-ray diffraction experiments are properly interpreted.

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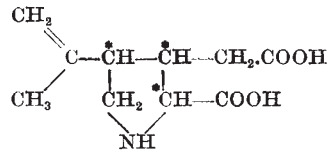
[1] Bendit, E. G., *Nature*, 179, 535 (1957).
[2] Gupta, V. D., *Nature*, 181, 113 (1958).
[3] Woods, H. J., *J. Colloid Sci.*, 1, 407 (1946).

Structure of Kainic Acid and its Isomer, Allokainic Acid

In 1953, Murakami, Takemoto and their collaborators[1] isolated the most active component of *Digenea simplex* Agardh which has been well known as an anthelmintic (vermifuge) for more than a thousand years. They named it kainic acid after 'Kaininso', the Japanese name of the mother alga. Kainic acid, $C_{10}H_{15}O_4N$, has an intense anthelmintic effect, about ten times that of santonin, without side-effects. In conjunction with chemical studies[2] to determine the structure of this interesting compound, we have carried out a structural determination by means of X-ray crystal analysis.

Following orthodox X-ray procedure the research was commenced with a salt containing zinc as a heavy atom. Zinc kainate crystallizes with two molecules of water in colourless prisms, which are orthorhombic. The space group was found to be $P2_12_12_1$, and the dimensions of the unit cell, containing four units of $C_{10}H_{13}O_4N\ Zn.2H_2O$, were as follows: $a = 25{\cdot}50$, $b = 6{\cdot}93$, $c = 7{\cdot}60$ A. By the trial-and-error method based on the presence of the heavy atom, electron-density projections along the *b*- and *c*-axes were derived, and the structure of kainic acid was found to be 2-carboxyl-3-carboxymethyl-4-*iso*propenylpyrrolidine, with the stereoconfiguration shown in the structural formula (asymmetric centres are marked by asterisks):



The structure of the molecule in the zinc salt is illustrated schematically in Fig. 1, where it is viewed along the *b*-axis.

In addition, we examined kainic acid itself. From water, kainic acid crystallizes with one water molecule, in colourless needles which are monoclinic. The dimensions of the unit cell were as follows: $a = 12{\cdot}07$, $b = 5{\cdot}86$, $c = 8{\cdot}19$ A., $\beta = 94{\cdot}7°$. The space group was $P2_1$, and the unit cell contained two units of $C_{10}H_{15}O_4N.H_2O$. By trial-and-error methods the electron-density projections along the three principal crystal axes were obtained, and the result was in