of the expected magnitudes, except that there is some evidence of repulsion between the methyl groups attached to the α- and β-positions. The β-methyl groups at the extreme ends of the picture appear to be somewhat displaced in position. Whether the whole structure is accurately coplanar or not must await a more accurate evaluation of the third co-ordinates of the atoms, which are perpendicular to this projection plane. In the meantime, it may be noted that difference syntheses based on this projection indicate clearly the number of hydrogen atoms attached to each carbon and thus show that the double bond is in the α–β position and not in the side-chain.

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The Free Amino-Groups of Soluble Feather Keratin

Feather keratin can be made soluble by extraction with urea and reducing agents or by oxidation with performic acid, and it has been shown that the resulting solutions contain particles with a small distribution of weight and charge and a molecular weight of 10,000 [1,2]. Rougvie[3] oxidized feather keratin directly with peracetic acid and similarly found the soluble particles to have a molecular weight of 10,000. He also made the important observation that fibres reconstituted from the oxidized material gave X-ray diffraction patterns with much of the detail of those of the original feather.

This communication is concerned with the results of an end-group analysis of oxidized feather keratin (cysteic acid – keratin) prepared according to the method already described[2]. The interpretation of the end-group analysis of other keratins has been difficult because the molecular weight of the reacting material has not been known. We do not have this complication in the case of feather keratin.

After reaction of cysteic acid – keratin with fluorodinitrobenzene (24 hr. in 50 per cent ethanol and 1 per cent sodium bicarbonate) and subsequent hydrolysis in 5·8 *N* or 12 *N* hydrochloric acid, the dinitrophenyl derivatives of aspartic acid, serine, threonine, glutamic acid, glycine, alanine and valine can be detected; ε-dinitrophenyl lysine is also present. However, the total amount of α-dinitrophenyl amino-acids corresponds to only 0·1 equivalents/mole of protein, and similarly the concentration of dinitrophenyl lysine is 0·1–0·15 mole/mole protein. Coupling of cysteic acid – keratin with fluorodinitrobenzene, in 2 *M* guanidine in 50 per cent ethanol, or in aqueous solutions at *p*H 11·5, gives a similar product to this. Traces of dinitrophenyl amino-acids can also be found in the ether extract of the acidified dinitrophenyl-keratin before hydrolysis, and it is possible that the few end-groups result from degradation during coupling.

Cysteic acid – keratin, treated with cation and anion exchange resins to remove small ions, combines with less than 0·2 equivalent hydroxyl ion/mole protein between *p*H 6 and 8·5. Between *p*H 8·5 and 10·5, 0·2 equivalents of OH^- ion are bound by each mole of protein. Hence few ε-amino-groups of lysine, α-amino-groups or imino-groups in each protein molecule are available to the hydroxyl ion.

The molecular weight of cysteic acid – keratin is known unambiguously and the gross composition is consistent with the absence of a non-protein prosthetic group, so the failure of the α-amino-groups to react with hydroxyl ion or with fluorodinitrobenzene is evidence that the protein has a cyclic structure.

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Electron Microscopic Observation of Monolayers of Synthetic Linear Polymers

When monolayers of some synthetic linear polymers at air/water interfaces are compressed to less than a certain area, bright streaks can be observed under dark-field illumination[1]. Subsequent compression gives rise to tiny visible striations running across the width of the trough and finally produces fibrous threads which can be picked up from the water surface. Since little is known about the structure of these heterogeneities, we have carried out an electron microscopic examination of spread films of synthetic polymers, and obtained, especially in the case of nylon, interesting pictures exhibiting the structure of the spread films.

A sample of 6-nylon (poly-ε-capramide, *D.P.*153) was spread from its mixed solution in benzene–phenol (3/1 v/v) on the surface of distilled water in a Langmuir trough. The uncompressed and compressed films were transferred to a collodion support by using a lifted film technique[2] for building up films on a slide. They were then shadow-cast with chromium at an angle of 12° to the surface and examined in a Hitachi *HS*-II type electron microscope. Micrographs are shown in Figs. 1 and 2. A blank water sample, which was transferred from the trough to a collodion support, is shown in Fig. 1,*a*.

When 6-nylon films were initially spread at an area of 80 A.^{2}/monomeric unit, unspread material was seen in the form of winding microfibrils (Fig. 1,*b*). The mean microfibrillar thickness was estimated to be 30 A. from the width of the shadow. The bare portions may contain film molecules that are less densely packed. When compressed to 30 A.^{2}/monomeric unit, the film produced a large number of microfibrils oriented approximately at right angles to the direction of compression and linked together to form a network (Fig. 1,*c*). This network may account for the elasticity which had been found with these films[3]. Further compression to 2 A.^{2}/monomeric unit brought about visible striations on the films. The film structure in this region exhibited an