diagrams there is evidence suggesting that likewise in *Spirogyra* cellulose the crystallites are slightly flattened, with the face of greatest extension oriented in the plane of the cell-wall. This was supported by the low-angle scattering (not shown in Figs. 1 and 2). In other words, crystallites of natural cellulose I may also have, in addition to (101), either (002) or (10$\bar{1}$) as their face of greatest extension.

Frey-Wyssling[8] has directed attention to the fact that the OH groups on carbon atoms VI, VI′, XII and XII′ in the Meyer–Misch cellulose structure may freely rotate about the C—C bonds of these carbon atoms. He has pointed out that a given position of these OH groups, deviating from the position shown in the classical Meyer–Misch structure, could favour crystallite growth in (101). This could explain why thus far in natural celluloses (101) exclusively had been observed as the plane of lamination and growth in area of the crystallites, whereas on the basis of the Meyer–Misch model one would expect this plane to be (002).

In the light of Frey-Wyssling's considerations, our findings suggest that there might occur in Nature three structural modifications of cellulose I which differ by the position of the OH groups in question. These different OH positions might favour different directions of micelle growth.

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Degradation of Biologically Synthesized Lactose labelled with Carbon-14

An investigation on the labelling of lactose-^{14}C from milk obtained from cows and goats was recently reported by Schambye[1]. The present communication describes a similar investigation on the distribution of carbon-14 in both hexose moieties of lactose obtained from the milk of a goat employing sodium formate-^{14}C as the lactose precursor (lactose-^{14}C was obtained through the courtesy of Mr. S. Misler, of these Laboratories).

A total of 123 mgm. of lactose-^{14}C were hydrolysed with 10 ml. of 0·5 *N* sulphuric acid in a sealed tube for 4 hr. at 100° C.[2]. The hydrolysate was adjusted to *p*H 4·5 with a saturated solution of barium hydroxide, filtered, the precipitate washed, and the filtrate plus washings concentrated to approximately 2 ml. using a current of warm air. The condensate was then chromatographed and scanned[3]. The scan showed the distribution of radioactivity between the two hexose moieties to be equal.

The galactose and glucose were separated and isolated using a coupled column of powdered cellulose (three sections, each diminishing in volume by one-half) and an eluting solvent consisting of ethyl acetate–pyridine–water (8 : 2 : 1)[4]. The total yield of the monoses was 46 per cent for glucose and 65 per cent for galactose.

The microbiological degradations of the hexoses were accomplished by a procedure similar to that of Bernstein *et al.*[5]. This degradation relies on the conversion of hexose to equimolar amounts of carbon dioxide, ethanol and acetic acid for each mole of hexose fermented as demonstrated by Gunsalus and Gibbs[6]. *Leuconostoc mesenteroides* cells required for Warburg fermentations were grown in the stock broth supplemented with separately sterilized 0·2 per cent glucose or galactose, depending upon the substrate to be degraded.

The fermentations employed for the initial step of the monosaccharide degradations were carried out at 30° C. under nitrogen in 125-ml. Warburg flasks containing 20 ml. of cell suspension in the main compartment with 0·03–0·05 m*M* substrate in the side-arm. At the conclusion of the fermentation, carbon dioxide was absorbed in alkali, removed, the cells inactivated by the addition of concentrated sulphuric acid and separated from the fermentation mixture by centrifugation.

Ethanol was isolated from the supernatant by distillation and then oxidized to acetic acid. Lactic acid was extracted from the distilland by ether extraction and treated with sulphuric acid and chromic oxide, yielding carbon dioxide and acetic acid. The step-wise degradation of acetic acid involved decarboxylation by the use of the Schmidt reaction as described by Phares[7] and the oxidation of the resulting amine to carbon dioxide.

Table 1. Distribution of Carbon-14 in Glucose and Galactose of Lactose in Milk

Carbon No.	1 × 10^{-3} μc./mgm. barium carbonate	Carbon No.	1 × 10^{-3} μc./mgm. barium carbonate
	Glucose		
1	3·3	2 + 3	1·8
2	1·5		
3	2·0	4 + 5 + 6	3·0
4	3·4	5 + 6	2·8
5	2·4		
6	2·9	1–6	2·9
	Galactose		
1	2·9	2 + 3	1·0
2	0·8		
3	1·1	4 + 5 + 6	3·0
4	3·7	5 + 6	2·3
5	2·3		
6	2·9	1–6	2·9

The degradation of both hexose moieties of the biologically synthesized lactose-^{14}C, summarized in Table 1, showed the degree of labelling in each of the carbons of the isolated hexose moieties to be, in decreasing radioactivity: carbon numbers 4, 1, 6, 5, 3, 2.

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