Table 1

Diet	Mean body-wt (kg)	Daily intake: Digestible energy (kcal)	Daily intake: α-linked glucose polymer* (g)	Plasma glucose concentration (mg/100 ml)	Glucose entry rate (mg/min kg)	CO_2 from glucose (%)	Glucose oxidized to CO_2 (%)
Barley	40·2	2080	331	57·7	1·24	3·55	16·7
Dried grass	40·0	2037	41	58·4	1·49	4·09	21·0
Hay	43·6	1965	78	57·5	1·37	3·86	16·5
SE of mean				1·80	0·12	0·22	1·69

*Expressed as glucose.

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Measurement of the flow of long-chain fatty acids into the duodenum of sheep. By AILEEN M. SCOTT, M. J. ULYATT* and R. N. B. KAY, *Rowett Research Institute, Bucksburn, Aberdeen*, and J. W. CZERKAWSKI, *Hannah Dairy Research Institute, Ayr*

Ulyatt, Czerkawski & Blaxter (1966) have described how two markers may be used to estimate the flow of solid and of fluid digesta through the rumen and abomasum and from these the flow of long-chain fatty acids was calculated. To test the technique directly two sheep fitted with rumen cannulas and re-entrant duodenal cannulas have now been used to measure and sample the flow of digesta into the duodenum by the method of Bruce, Goodall, Kay, Phillipson & Vowles (1966) and the duodenal flow was also estimated by the two-marker technique. Pelleted dried grass, 800 g daily, was given continuously from a moving belt apparatus and water, 3 l. daily containing 15 g polyethylene glycol (PEG), was infused continuously into the rumen. In one experiment the grass was given alone and in a second experiment an emulsion of linseed oil fatty acids was added to the rumen infusate.

The digesta were centrifuged at 2750 *g* and total long-chain fatty acids were determined in both the sediment and the supernatant liquid. The dried solids were analysed for lignin (Czerkawski, 1967) and the supernatant liquid for PEG (Smith, 1959). The dietary intake of lignin divided by its concentration in the solids gave an estimated flow of solids, and the amount of PEG infused divided by its concentration in the supernatant liquid gave an estimated flow of fluid.

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Table 1. *Observed and estimated flow of duodenal digesta, and the intake and duodenal flow of long-chain fatty acids in two sheep*

	Intake of fatty acids (g/24 h)	Digesta flow measured directly		Digesta flow measured by marker technique		Concentration of saturated acid in total fatty acid (g/100 g)	
		Volume (ml/24 h)	Fatty acids (g/24 h)	Volume (ml/24 h)	Fatty acids (g/24 h)	Intake	Digesta flow
		Grass only					
Sheep A	18·8	10115	29·1	10847	21·0	18	73
Sheep M	18·8	8205	14·0	11895	15·1	—	—
		Grass plus linseed oil fatty acids					
Sheep A	70·1	9271	73·2	11202	74·3	10	65
Sheep M	70·1	7803	67·7	10065	62·6	—	—

Table 1 shows the directly observed and the estimated flows of duodenal digesta and of fatty acids; 94% of the acids was associated with the solids. The unsaturated acids were largely hydrogenated by the time they reached the duodenum. The flow of fatty acids into the duodenum estimated by the two-marker technique was similar to the intake, as previously found by Ulyatt *et al.* (1966), indicating that gains and losses during passage through the forestomach and abomasum are small or balanced under these conditions.

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Fermentation of various soluble carbohydrates by rumen micro-organisms. By J. W. CZERKAWSKI and GRACE BRECKENRIDGE, *Hannah Dairy Research Institute, Ayr*

The modes of fermentation of twenty-six different carbohydrates by mixed rumen micro-organisms were studied in an artificial rumen. The apparatus and the experimental procedure have already been described by Czerkawski & Breckenridge (1969). The carbohydrates investigated could be divided into four groups, largely according to the rate of their fermentation, which was usually accompanied by the production of methane:

(a) Glucose, fructose and sucrose were fermented rapidly.

(b) L(+)-arabinose, xylose, galactose, mannose, cellobiose, maltose, lactose, raffinose, inulin, xylan and pectin were fermented at appreciable rates, but these rates were significantly lower than those in the first group.

(c) D(−)-arabinose, ribose, sorbose, mannitol, sorbitol, glucuronic and galacturonic acids, trehalose, starch and fucose were fermented slowly or not at all.