Table 1. FREEZING POINT DEPRESSIONS AND DRY MATTER PERCENTAGE OF THE GUT CONTENTS OF *B. indicus* AND *B. taurus*

	Freezing point depression				Dry matter			
	Means		Difference of means	Significance of difference	Means		Difference of means	Significance of difference
	B. indicus	*B. taurus*			*B. indicus*	*B. taurus*		
Abomasum	0·549	0·555	0·006	nil	—	—	—	—
Duodenum	0·912	0·874	0·038	nil	13·8	9·8	4·0	nil
Jejunum	0·917	0·969	0·052	nil	10·0	11·0	1·0	nil
Ileum	0·654	0·668	0·014	nil	8·1	8·8	0·7	nil
Cæcum	0·566	0·526	0·040	nil	15·0	12·8	2·2	5 per cent
Proximal colon	0·583	0·545	0·038	5 per cent	13·8	12·3	1·5	5 per cent
Middle colon	0·511	0·463	0·048	app. 5 per cent	14·0	12·2	1·8	1 per cent
Distal colon	0·483	0·373	0·110	1 per cent	15·8	14·5	1·3	nil
Fæces, group 1	0·510	0·287	0·223	0·1 per cent	14·1	10·9	3·2	1 per cent
Fæces, group 2	0·358	0·287	0·071	5 per cent	16·1	14·1	2·0	5 per cent
Fæces, group 3	0·369	0·231	0·138	0·1 per cent	—	—	—	—
Blood	0·541	0·531	0·010	nil	—	—	—	—

grazing together or near each other at the same time, there was always a significant difference between means. The means of three groups of fæcal samples are given in Table 1. Group 1 consisted of samples from six steers of each type which had been grazing together for several months. Group 2 was a repetition with this herd a few months later, and the blood samples were also taken from this herd. Group 3 was made up of ten fæces samples from a herd of each type grazing near each other at the same time on similar pasture.

Differences in freezing points and dry matter occur in the large intestinal contents and fæces, the osmotic pressures and dry matter of both being greater in zebus than grades. The results differ significantly from those of Brauwer and v. Weerden in that the fæces osmotic pressure of European cattle is lower here than the value they give. This may be due to climatic causes; but we have evidence (unpublished) that a difference between sexes exists in the properties of the fæces and may be relevant here since we obtained all our fæces samples from steers. The higher dry-matter content of the gut contents of zebus over grades may be connected through water economy with the greater tolerance of this type to hot and dry conditions.

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Missing Step in Man, Monkey and Guinea Pig required for the Biosynthesis of L-Ascorbic Acid

MAN, other primates and guinea pig are the only mammals that are known to be unable to synthesize L-ascorbic acid; thus they require vitamin C in their diet to prevent scurvy. The rat, a typical species that is independent of a dietary source of the vitamin, synthesizes L-ascorbic acid from D-glucose as follows[1–6]: D-glucose → D-glucuronolactone → L-gulonolactone → L-ascorbic acid. Recent studies[4–6] show that guinea pigs are unable to convert L-gulonolactone to L-ascorbic acid, a step which is catalysed in rats by enzymes present in liver. This communication reports that man and monkey also cannot convert L-gulonolactone to L-ascorbic acid.

L-Gulonolactone-1-^{14}C was incubated in homogenates of human and monkey liver and the amount of carbon-14 incorporated into L-ascorbic acid was measured by a procedure used previously[6].

Table 1. CONVERSION OF L-GULONOLACTONE-1-^{14}C TO L-ASCORBIC ACID IN HUMAN, MONKEY, GUINEA PIG AND RAT LIVER HOMOGENATE*

Species	No. of experiments	Average conversion (per cent)
Rat	4	8·0 ± 1·9†
Man‡	3	< 0·07
Monkey	2	< 0·07
Guinea pig	3	< 0·05

* Experimental conditions and procedure for isolation of L-ascorbic acid were same as those used previously (ref. 6).
† Average deviation.
‡ Samples of human liver were obtained by surgical biopsy.

In Table 1 the results of these experiments are compared with those obtained previously for rats and guinea pigs[6]. Appreciable incorporation of carbon-14 into L-ascorbic acid was observed in rat liver but none was detected in human, monkey and guinea pig liver; values being less than one one-hundredth those obtained in rats. Finding that man, monkey and guinea pig are unable to convert L-gulonolactone to L-ascorbic acid points out the biochemical step missing in the liver of these species required for the biosynthesis of L-ascorbic acid. (Unpublished observations show conversion of D-glucuronolactone-6-^{14}C to labelled L-gulonic acid in monkey, guinea pig and rat liver. The occurrence of this reaction in guinea pig and rat liver was suggested initially from enzymatic studies of ul Hassan and Lehninger[4].)

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