mented with a weighed amount of hay. The experiment was divided into two periods: seven days as preliminary period and ten days as original one. The amount of hay and of milk given was just sufficient for maintenance. Cow's milk was used first, and then the experiment was repeated using buffalo's milk. The sample of milk given daily was prepared from the daily mixture of cow's or buffalo's milk collected from the Faculty's herd. A sample of milk as given to the sheep was taken daily, and its density and the percentage of dried matter, fats, proteins and lactose determined. Faeces were collected daily and dried in an oven at 70°C., and then ground at the end of the experiment and kept for analysis.

The final figures for the digestibility of the different constituents of both types of milk from the average figures obtained from the three sheep, with the exception of lactose (means of two sheep only), were as follows:

Coefficient of digestibility of	Dry matter	Proteins	Fats	Lactose
	%	%	%	%
Cow's milk	79.21	83.18	97.07	75.27
Buffalo's milk	77.04	83.87	97.62	74.78

From these results, it can be concluded that the digestibility coefficients of the different constituents of buffalo's milk are practically equal to those of cow's milk. As regards protein digestibility, we have verified this result in a separate experiment using pepsin and hydrochloric acid, when it was found to be 95.01 for cow's milk and 95.47 per cent for buffalo's milk. It seems, therefore, that the relative high amount of fat in buffalo's milk did not affect the digestibility of proteins and fats. The figures of the digestibility coefficients of lactose obtained in our experiment were low, although it is known that the digestibility is very high; this may be attributed to the bacteria present in the stomach of the ruminants. The idea of medical men that cow's milk is preferable to buffalo's milk, in our opinion, has no physiological basis.

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Rancidity in Indian Butter Fat (Ghee)

CHANGES in analytical characteristics following upon the onset of rancidity in butters and butter-fats have been widely studied¹⁻⁶, with somewhat discrepant results. This is scarcely surprising in view of the number of variables involved, within the material itself and in the conditions of its spoilage. In the work here reported, the samples of ghee were prepared with some care and represent genuine products in good condition; the specimens examined were not chosen at random but belonged to three definite types—one, from Kirkee, of high Reichert value (30-40) and low iodine value (c. 28) typical of well-kept dairy buffaloes, another of normal Reichert value (c. 25) and iodine value (c. 38) from dairy cows, and the third of low Reichert value (14-22) and high iodine value (33-40) derived from buffaloes fed mainly on cotton-seed. The samples had all been stored in similar conditions, namely, in glass bottles with fairly loose-fitting wooden corks placed in a laboratory cupboard for periods of three to four years at a temperature range of 15-25°C. The analytical

characteristics of the samples were determined before and after storage, and the average changes in each group were as below.

CHANGES IN THE ANALYTICAL CHARACTERISTICS OF GHEES ON STORAGE

	A. High Reichert value, low iodine value. (11 samples)	B. Normal Reichert value, normal iodine value. (12 samples)	C. Low Reichert value, high iodine value. (10 samples)
Acid value	+24.9	+10.0	+18.2
Peroxide "	+69.4	+64.9	+107.8
Reichert "	+4.3	+4.1	+3.9
Polenske "	+1.19	+0.93	+0.76
Iodine "	-10.8	-8.3	-16.4
Saponification value	+14.7	+11.1	+13.6

In the three groups, changes in individual samples were all very similar to the average changes listed in the above table; while the parallelisms between the alterations in each characteristic suggest that they all proceed from a single general cause. Large increases in acid value (usually also associated with large increases in peroxide values) were almost invariably accompanied by large increases in Reichert, Polenske and saponification value, and, most significantly, by big falls in iodine value. The inverse relation between rise in acidity and loss in iodine value indicated oxidative rancidity as the dominant factor in the normal spoilage of butter-fat in the tropics; this inverse relationship is strikingly evident in the smooth curves obtained when acid values are plotted against iodine value losses.

In a further effort to investigate the course of spoilage, the individual specimens in each of the three groups were mixed and the free fatty acids separated, the characteristics of the rancid product and its neutral and acidic constituent fatty acids being then determined. The free acids from each group had high Reichert and Polenske and saponification values and very low iodine values (14-20). Lower acids had presumably been produced by oxidation of unsaturated acids, mainly oleic, rather than by lipolysis from lower fatty acid glycerides, since the Reichert and Polenske values of the de-acidified ghees closely resembled those of the original specimens when fresh (showing that these glycerides had largely remained intact). The low iodine values contrasted with the high figures obtained for the free fatty acids from rancid butter by Davies⁷, and again pointed to a mainly oxidative mechanism producing free acidity in butter-fat as opposed to a lipolytic one (somewhat selective towards oleic glycerides) in butter.

Work is in progress here on the more exact nature of the free fatty acids, an account of which will be published later. The work above reported was carried out at the Department of Biochemistry, Indian Institute of Science, Bangalore, India, and grateful acknowledgment to Mr. B. N. Banerjee and Prof. V. Subrahmanyam is made for their interest in its progress.

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