

(ii) The quantum of dietary protein required to produce nitrogen equilibrium at different levels of work is a linear function of the quantum of work performed.

(iii) The quantum of protein metabolised is also a linear function of the quantum of work performed.

(iv) The increment in dietary protein necessary to restore the animal to nitrogen equilibrium for each increment in work (about 5 grams for an increment in work of 2 hours) is small, and reckoned in terms of the energy liberated by the extra protein metabolised, is entirely inadequate to account for the energy required for the extra work performed. The significance of this small increase in the protein of the diet is, therefore, to be sought in causes other than inadequate calorie intake.

Studies of the nitrogen partition of the urine of the animals during the course of the work, showed that the major part of the increased output of endogenous nitrogen was in the form of Urea + Ammonia, indicating that the deamination phase of protein metabolism was the most active. Creatine occurred sporadically but in insignificant amounts. Creatinine excretion was very regular (2.5-3.0 gm. per diem) at all levels from rest to intense work, indicating that during muscular work even at high levels, tissue breakdown did not result in the excretion of creatine or creatinine; the metabolism of these compounds obeyed Folin's law, for rest as well as intense muscular work.

The coefficient of digestibility of the dietary nitrogen remained unchanged at all levels of work.

Full details of this investigation will be published elsewhere shortly.

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Optical Activity of Lac

It is surprising that the optical rotatory power of lac has, so far, not been investigated; this is probably due to the circumstance that lac possesses a deep orange red colour. The colour of lac can be removed either by treatment with decolourising carbons or by bleaching with hypochlorite. Both treatments yield a product sufficiently colourless to enable an accurate determination of its optical activity.

An alcoholic solution of *Kusum* seed lac (10 per cent.) was treated with norit and filtered under suction over a bed of Kieselguhr. The clear but slightly yellow coloured solution which was thus obtained was employed for the determination of its optical activity.

The decolourised solution of lac was fractionated into (1) sclerolac and (2) soft lac by the addition of 10 volumes of ether to a given volume of the alcoholic solution of lac; the optical activity of the two lac fractions was determined in alcoholic solutions.

Analogous experiments were carried out with a sample of *Kusum* lac which was bleached by hypochlorite. Table I gives the results.

TABLE I
Specific Rotation $[\alpha]_D^{25^{\circ}\text{C}}$

	Lac decolourised by norit	Lac bleached by hypochlorite
Whole lac	+ 60.71	+ 59.29
Sclerolac fraction	+ 54.83	+ 51.26
Soft lac fraction	+ 63.60	+ 59.96

Further work on the isolation of the optically active constituents of the sclero- and the soft-fractions of lacs is in progress. The optical activity of lac is a property which should be of great value in studying the reactions of lac with ureas, fatty acids and other substances.

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