relation to conditions of packing and storage, the method of 'scalding', time of dehydration, etc., obviously requires further investigation.

Even in dehydrated amla fruit (*Phyllanthus emblica*), powdered, in tablets, and vacuum-packed, steady though slow loss of ascorbic acid occurs on storage. Amla, unlike common vegetables and fruits, contains tannins which have a protective effect on ascorbic acid. The loss in amla is slower than in the case of common vegetables, but the fact that loss does occur under such conditions suggests that ascorbic acid is unlikely to be very stable in other dehydrated vegetables and fruits not packed in containers from which oxygen has been excluded.

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Urea Synthesis in Mammalian Liver

BACH and Williamson[1] claim to have shown that rat liver forms urea from ammonium lactate even when the activity of arginase is inhibited by high concentrations of ornithine[2]. They conclude that liver can synthesize urea without the participation of arginase.

The data presented by Bach and Williamson are capable of a different interpretation. A relevant feature of their experiments is the extraordinarily low activity of arginase. According to their graphs 3 and 4, 1 mgm. liver (wet weight) formed 1·26 μgm., or 0·75 μgm., urea per hour, the first figure referring to an arginine concentration of 12·4 mgm. per cent, the second of 7·5 mgm. per cent. The potential arginase activity of rat liver under similar conditions, that is, at the same arginine and *p*H, is shown in Table 1[3].

TABLE 1. ARGININE ACTIVITY OF RAT LIVER AT DIFFERENT ARGININE CONCENTRATIONS (*p*H 7·4; 0·025 *M* PHOSPHATE BUFFER; 4 ML. TOTAL VOLUME; 40 MINUTES INCUBATION AT 40°).

Concentration of arginine	Urea nitrogen formed by 1 mgm. (wet weight) ground rat liver
1112 mgm. per cent	369 μgm.
556 ,,	371 ,,
278 ,,	347 ,,
139 ,,	265 ,,
69·5 ,,	180 ,,
34·8 ,,	117 ,,
17·4 ,,	75 ,,
8·7 ,,	43 ,,

TABLE 2. ARGINASE ACTIVITY IN THE EXPERIMENTS OF BACH AND WILLIAMSON COMPARED WITH POTENTIAL ARGINASE ACTIVITY.

Arginine concentration	Arginase activity (μgm. urea nitrogen formed per mgm. wet liver per hour)	
	Potential activity	Bach and Williamson
12·4 mgm. per cent	88	1·3
7·5 ,,	63	0·8

The comparison of the arginase activity observed by Bach and Williamson with the potential activity obtained by graphical interpolation from Table 1 shows that no more than a minute fraction—about 1·3 per cent of the total arginase—was active in the experiments of Bach and Williamson (Table 2); presumably it was only the arginase from the surface layer of the slices or from disintegrated cells which reacted. The inhibition by ornithine refers to this fraction only. The bulk of the tissue arginase—more than 98 per cent—did not come into play in the inhibition experiments of Bach and Williamson. These, therefore, do not show that the arginase in their liver slices was inhibited, and it is thus unnecessary to conclude that there is a urea formation without arginase.

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[1] Bach, S. J., and Williamson, S., NATURE, **150**, 575 (1942).

[2] This inhibition was first observed by R. E. Gross (*Z. physiol. Chem.*, **112**, 236; 1920). L. Hellerman and C. C. Stock (*J. Biol. Chem.*, **125**, 771; 1938) suggest that it may be due to the formation of metallic complexes of ornithine.

[3] The activities vary somewhat with sex, age and other factors, but are always of the same order of magnitude (see E. Baldwin, *Biol. Rev.*, **11**, 247; 1936; H. D. Lightbody, *J. Biol. Chem.*, **124**, 169; 1938).

IT seems scarcely possible to compare the activity of arginase observed with intact cell material suspended in bicarbonate buffer with that of ground tissue in phosphate buffer. There is also no linear proportionality between arginase activity and weight of slices[1].

If part of the arginase activity in the experiments with slices was caused as Krebs suggests by 'disintegrated cells', this criticism could surely be more justifiably applied to his experiments with ground tissue.

Krebs's criticism leads to the assumption that the 'tissue arginase' is incapable of decomposing added arginine but is active in the formation of urea from added ammonium lactate (via arginine). No explanation is given for this hypothetical difference.

Details of our work will be given elsewhere in due course.

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[1] Leuthardt, F., and Koller, F., *Helv. chim. Acta*, **17**, 1030 (1934).

Growth Stimulators in Urinary Extracts

IN a recent communication by Werner and Doljanski, the growth-promoting effects of certain tissue extracts upon tissue cultures are described[1]. The methods of extraction indicate that the active extracts may contain protein or protein-associated groups.

It may be of interest to note that in the fractionation of the growth-inhibiting extract of urine, H. 11 Extract[2], which is now being used in the treatment of cancer, certain fractions have been obtained which are stimulatory to the growth of transplanted tumours. Such fractions are protein-free and can contain only substances of relatively low molecular weight. It therefore seems likely that non-protein growth-promoting substances are present in the tissues.

An example of such a stimulatory solution is that obtained when neutral H. 11 Extract is fractionated by precipitation with copper salts. Extraction of this precipitate with dilute hydrochloric acid yields an insoluble tarry substance which is partially soluble