The lability of this latter enzyme and the firmness of its attachment to the tissue suggests its identity with cytochrome oxidase. If this latter enzyme were present in the leaf, Sreerangachar's preparation would be expected to contain both the enzyme and its substrate. Cytochrome oxidase together with cytochrome can oxidize both catechol and ascorbic acid, although the enzyme alone is completely specific for cytochrome. The peroxidase in the preparation would also utilize the hydrogen peroxide produced during the oxidation of cytochrome for oxidation of its substrates. In these conditions, with hydrogen peroxide already present, addition of more hydrogen peroxide might not accelerate the oxidation, and the enzyme preparation would apparently have no peroxidase activity.

This interpretation would seem to explain our apparently contradictory findings as to the nature of the oxidizing enzymes in tea leaf. Sreerangachar's finding that tea tannin can be oxidized directly by an enzyme preparation obtained from tea leaf does not necessarily establish the presence of a tannin or catechol oxidase in the system. The claim put forward by one of us[2] that ascorbic acid oxidation is the primary stage in the fermentation process is also withdrawn. The direct oxidation of ascorbic acid by tea leaf tissue finds an adequate explanation in terms of the above theory. Other evidence has also been found against the existence of ascorbic acid oxidase in tea leaf, and these findings together with a fuller investigation of the cytochrome oxidase will be published elsewhere at a later date.

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[1] Sreerangachar, H. B., *Curr. Sci.*, 8, 13 (1939).
[2] Roberts, E. A. H., *Biochem. J.*, 33, 842 (1939).

Role of Manganese in the Biological Synthesis of Ascorbic Acid

In continuation of my previous work[1], it has been found that the guinea pig liver also can synthesize ascorbic acid from the sugar precursors both *in vitro* and *in vivo*. The concentration of manganese necessary for the synthesis is much higher than that required in the case of rat liver.

In vitro			*In vivo*		
% Mn in R.-L.	Sugar	Mgm. ascorbic acid per gm. liver	Exp.	Mgm. ascorbic acid per gm. liver	Remarks
0·10	Mannose	0·20	1 c.c. N.S. intraperitoneally	0·21	Killed after five hours.
0·01	Mannose	0·14			
0·10	Galactose	0·17	40 mgm. galactose in 0·04% Mn intraperitoneally (1 c.c.)	0·25	
0·01	Galactose	0·13			
Nil	Nil	0·13			
			0·5 c.c. N.S. 25 mgm. mannose in 0·5 c.c. of 0·04% Mn	0·24	Young growing guinea pigs killed after 8 hours
				0·30	

The hypothesis is advanced that the inability of the guinea pig and man to synthesize their requirement of ascorbic acid is due to the lack or insufficiency of manganese in their tissues. The active oxidative or dehydrogenating mechanism is made up of manganese and the dehydrogenase, manganese acting in the capacity of a coenzyme.

Further investigation in support of the hypothesis is in progress. Details will be published elsewhere.

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[1] Nature, 143, 811 (1939).

Polyploids are More Variable than their Original Diploids

Studying the modification of a large number of experimentally produced polyploid plants of various species and families (Solanaceæ, Gramineæ, Compositæ, etc.) within the single plants and in the polyploid lines in respect to the modification of their diploid forms, when the plants grew in equal environmental conditions, I found the following regularities. Cell dimensions showed in the majority of the cases studied a greater modification in the tetraploid than in the diploid plants. Cell dimensions of the experimentally produced octoploids were more variable than the cell dimensions of tetraploid and diploid forms. The numbers of chloroplasts per pair of stomatal cells were more variable in the tetraploids than in the diploids and much more variable in the octoploids than in the tetraploids and diploids. Counting, for example, the chloroplasts[1] in 100 pairs of stomatal cells of each form of *Nicotiana alata*—diploid, tetraploid and octoploid, the following values for the standard deviations were respectively found: $\sigma_{2n} = 1{\cdot}81$, $\sigma_{4n} = 4{\cdot}76$, and $\sigma_{8n} = 7{\cdot}03$. (It was found that polyploidy does not affect the size of the chloroplasts[1,2]. It also does not significantly affect the variability of the chloroplast diameter.) The modification of the cell dimensions decreases somewhat gradually in the subsequent polyploid generations, that is, it decreases with the increase of the polyploid generations. But in the cases studied tetraploids still had more variable cell dimensions in the fifth generation than the corresponding diploids.

It was logical to expect that a greater modification of the cell sizes and of the numbers of the chloroplasts (assimilatory organs) of the polyploid forms should condition a greater modification of the plant size as well as of all the dimensions of the plant organs. Our measurements showed that this is true in the majority of the cases. Plant size, leaf dimensions, and flower dimensions were in the majority of the cases much more variable in the tetraploids than in the diploids. The organ dimensions of the octoploids were more variable than those of the diploids and tetraploids.

It was also logical to expect that a greater modification of the cell dimensions of the octoploid and tetraploid plants should lead to more frequent developmental anomalies. It was found that tetraploid plants formed a greater percentage of abnormal flowers and leaves than the diploids. The tendency was noted for tetraploids originating from species with large chromosome numbers to form a somewhat greater percentage of abnormal flowers than the tetraploids originating from species with small chromosome numbers. Experimentally produced octoploids formed a much greater percentage of