Experiments are being carried out in order to settle the question whether vitamin E is also identical with the light white casein factor of Coward *et al.*[3], a possibility which might be supported by the fact that an exhaustive treatment with alcohol is necessary for the complete removal of vitamin E from casein used in artificial diets.

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[1] Dam and Glavind, NATURE, **142**, 1077 (1938).
[2] Dam and Glavind, Bernth and Hagens, NATURE, **142**, 1157 (1938).
[3] Coward, Key and Morgan, *Biochem. J.*, **23**, 695 (1929).

Role of Manganese in the Biological Synthesis of Ascorbic Acid

Guha and Ghosh[1] found that rat liver incubated with mannose produced ascorbic acid, and followed it up by showing that parenteral administration of mannose also produced ascorbic acid in the rat tissue and notably in the liver. Euler *et al.*[2] were unable to confirm the *in vitro* results, which was explained as due to the absence of molecular oxygen[3] as Euler's experiment was made in an atmosphere of nitrogen. However, Hawthorne and Harrison[4] and Klodt[5] also could not confirm Guha's results *in vitro* or *in vivo*.

It has now been found that manganese is a determining factor in the synthesis of ascorbic acid by rat tissue. The experiments of Hawthorne and Harrison (*loc. cit.*) were repeated with this modification, that the Ringer-Locke solution in which the liver was incubated with mannose contained 0·02–0·001 per cent manganese as manganese chloride. The concentration of manganese in the incubated mixture thus ranged from 0·01 to 0·0005 per cent. In my series of experiments 0·001–0·0005 per cent of manganese in the incubated mixture has been found to be most favourable for the synthesis of ascorbic acid *in vitro*. It has also been found that galactose, like mannose and glucose to a less extent, may also act as precursors. In *in vivo* experiments, the mannose solution given intravenously contained 0·001 per cent manganese as the chloride. Typical results are given in the accompanying table.

In vitro			*In vivo*	
% Mn in R.-L.	Sugar	Mgm. ascorbic acid per gm. liver	Mgm. ascorbic acid per gm. liver	
			Control (N.S.)	Mannose+Mn
0·002	Mannose	0·22	0·25	0·32
0·002	Galactose	0·21	0·21	0·29
0·002	Glucose	0·19		
Nil	Mannose	0·16		
Nil	Nil	0·16		

Details are being published elsewhere.

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[1] NATURE, **134**, 739 (1934); **135**, 871 (1935).
[2] *Biochem. Z.*, **282**, 399 (1935).
[3] NATURE, **138**, 844 (1936).
[4] *Biochem. J.*, **31**, 1061 (1937).
[5] *Arch. Exp. Path. Pharm.*, **189**, 157 (1938).

Points from Foregoing Letters

F. Adler and H. von Halban, jun., discuss the energy liberation of a nuclear reaction chain, consisting of successive fissions of the uranium nucleus by slow neutrons, and maintaining itself by the neutrons liberated in the fissions. The addition of a small quantity of cadmium to the system provides the possibility of controlling the energy liberation. The system will become stable at a temperature which is characteristic for the chemical composition and the dimensions of the system.

T. Bjerge, K. J. Brostrøm and J. Koch have measured the decay curves of the fission products of uranium bombarded with fast and slow neutrons, and have carried out similar measurements on the fission of thorium. The decay curves with either fast or slow neutrons had the same shape, showing that the fission processes give rise to great numbers of different nuclei, the individual characters of which are smoothed out in the decay curves.

Tracks, on photographic plates with a thick coat of emulsion, of recoil nuclei produced by the action of neutrons from uranium have been recorded by L. Myssowsky and A. Jdanoff. Their range is very close to that of α-particles of uranium. The number of tracks of recoil nuclei having ranges greater than 1·5 cm. in air is equal to about one hundred nuclei per square centimetre per minute, in fair agreement with the results of Frisch.

The emission of short-range groups of α-particles from oxygen, nitrogen and fluorine under proton bombardment has been discovered by W. E. Burcham and C. L. Smith. The group from fluorine follows a resonance excitation curve similar to that obtained for the γ-rays also produced by bombarding fluorine with protons. The groups from oxygen and nitrogen are interpreted as due to disintegrations of rare isotopes of these elements.

R. C. Majumdar and D. S. Kothari state that if the initial energy of a meson exceeds two thousand million electron volts ($2Mc.^2$) it could be transformed into two heavy particles, a proton and a neutron. It is possible that the protons and neutrons found in cosmic rays may arise in this manner.

A group of investigators from Osaka Imperial University have redetermined the isotopic masses of carbon and nitrogen by comparison of the doublets CH_4—O and CH_2—N and find the values 12·00394 and 14·00761 respectively.

F. W. Aston discusses the difference between his own value for the isotopic weight of ^{12}C and those obtained by other workers using double focusing mass-spectographs. He points out that while the accuracy claimed is much greater than his own, there are results which suggest the possibility of systematic error. The discrepancy remaining is, however, very small.

Spectra of the 4046 radiation of mercury, scattered by benzene, acetic acid, salol and glycerine, are submitted by Sir C. V. Raman and C. S. Venkateswaran, showing that glycerine behaves in this respect like an