MANGANESE AND VITAMIN C

APPARENTLY a number of factors influence the ascorbic acid content of tomatoes. Kohman and Porter[1] showed that the ascorbic acid content of young tomato plants was increased by solar rays. Again it was demonstrated that potash fertilization[2] influenced the amount found in the ripe fruit and that this roughly correlated with the sugar content. Further, it was shown[3] that tomatoes grown upon certain soil types had a larger ascorbic acid content than tomatoes grown on other soil types.

In a discussion of this problem with Dr. E. F. Kohman it was suggested that manganese might be an influencing factor. Since the available manganese is known to vary in many soils, a survey of this problem was undertaken in 1939–40. The ascorbic acid content of the fruit from plants grown on twelve soils known to be low in available manganese averaged 200 milligrams per liter of pulp, whereas samples from twelve soils known to be higher in available manganese analyzed 269 milligrams.

In pot culture the application of 1 gram of $MnSO_4 \cdot 4\ H_2O$, in a localized area, to 15,000 grams of Sassafras sandy loam soil, testing pH 7.1, increased the ascorbic acid content in tomato pulp from 142 to 243 milligrams per liter. This is by no means all the information that leads us to believe that manganese is a factor in ascorbic acid formation but will serve to illustrate the point.

Since over a few pounds of soluble manganese per acre in the soil is known to be toxic to tomato plants, much work must be done to establish the optimum quantity, the proper method of application and the soil types requiring it. This problem is being investigated further, but owing to the nature of the problem it is reported at this time.

JACKSON B. HESTER
DEPARTMENT OF AGRICULTURAL RESEARCH,
CAMPBELL SOUP COMPANY, RIVERTON, N. J.

CRYSTALLINE INSULIN DERIVATIVES

A NUMBER of various derivatives of insulin have been prepared, and attempts were made to obtain some of them in crystalline form, but without success.[1] We have recently described elsewhere[2] the preparation and physiological activity of several azo derivatives of insulin. Two of these derivatives, insulin-p-azophenylsulfonic acid and insulin-p-azobenzyltrimethylammonium chloride yielded perfectly shaped rhombohedral yellow crystals when not more than six groups were coupled to a single insulin molecule (mol. wt. taken to be 40,000). With insulin-p-azophenylsulfonic acids containing ten and fifteen groups only deformed ellipsoid shaped crystals were obtained, while attempts to crystallize insulin-p-azobenzyltrimethylammonium chloride containing fifteen groups failed. This suggests that in addition to the number of groups, there are other factors which affect the crystallization of such derivatives.

It is of interest that heavy atoms easily traced by x-ray analysis could be introduced by this method into the insulin molecule. Such compounds might be helpful in the x-ray analysis of insulin crystals. With this in view we prepared insulin-p-azoiodobenzene and insulin-p-azophenylarsonic acid in crystalline form.

The crystallization was carried out as suggested by Scott.[3] Most of the crystals obtained had edges of about 0.05 mm, although there were present a considerable number of very small crystals. A large amount of material remained amorphous and our yields were low. In several instances the crystals were tested for physiological activity and it could be demonstrated that the insulin action was maintained essentially to the same extent as it was in the amorphous insulin azo derivatives.[2]

E. H. LANG
L. REINER
THE EXPERIMENTAL RESEARCH LABORATORIES,
BURROUGHS WELLCOME & CO., U. S. A.,
TUCKAHOE, N. Y.

SCIENTIFIC BOOKS

ENGINEERING

Stress Analysis and Design of Elementary Structures. By JAMES H. CISSEL, professor of structural engineering, University of Michigan. x + 335 pp. Illustrated. New York: John Wiley and Sons, Inc. 1940. $4.00.

AN engineer engaged in general practice will find this book a valuable reference work with regard to branches of civil engineering other than the one with which he may have special familiarity. It frankly does not go far enough to meet the specialist's needs in any one field, but it is truly unusual to find within the covers of a single 335-page volume so much of practical utility in each of the various fields of structural steel, both riveted and welded, timber construction, reinforced concrete, masonry and foundations.

Many formulas of importance are given and, while economy of space has not permitted their derivation, footnote references enable one to find their source

[1] E. F. Kohman and D. R. Porter, SCIENCE, 92: 561, 1940.
[2] J. B. Hester, *Amer. Fert.*, 93, November, 1940.
[3] J. B. Hester, *Proc. Soil Sci. Soc. America*, 1940.

[1] C. R. Harington and A. Neuberger, *Biochem. Jour.*, 30: 809, 1936; R. F. Clutton, C. R. Harington and M. E. Yuill, *ibid.*, 32: 1111, 1938.
[2] L. Reiner and E. H. Lang, *Jour. Biol. Chem.*, in press.
[3] D. A. Scott, U. S. Pat. No. 2,143,590, January 10, 1939.