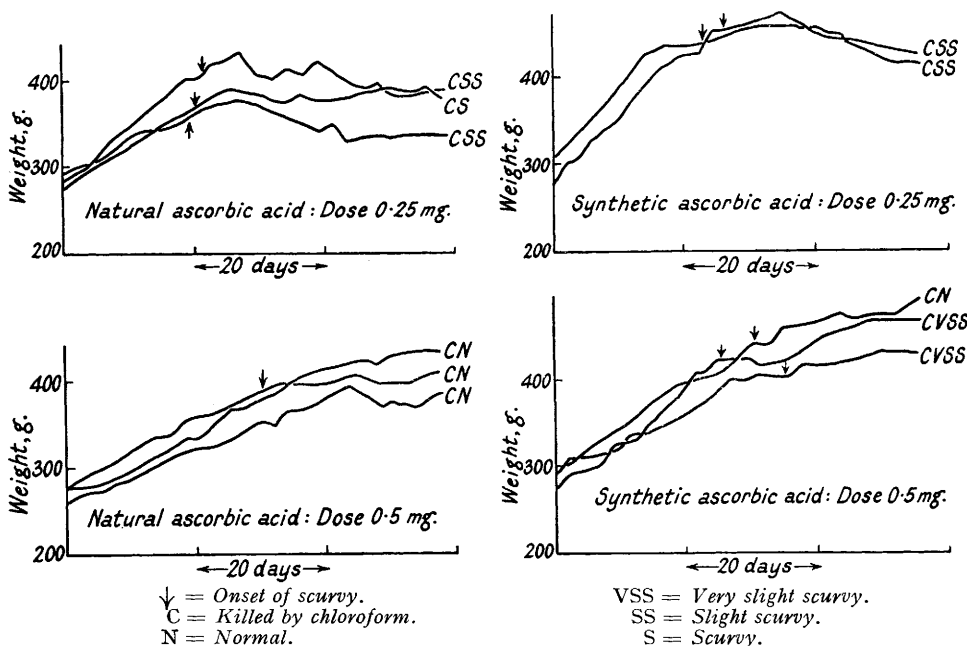


249. *Physiological Activity of Synthetic Ascorbic Acid.*

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A SPECIMEN of synthetic *l*-ascorbic acid obtained in the Birmingham laboratories was submitted to biological tests which have been carried out by one of us (S. S. Z.) at the Lister Institute, London. The synthetic method employed was the same as that published by Haworth, Hirst, and others (J., 1933, 1422) and modified (with enhancement of yield) as described in a subsequent paper for the case of *l*-arabo-ascorbic acid (this vol., p. 62). The specimen was analytically pure, m. p. 192°, $[\alpha]_D^{20} + 23^\circ$ in water (*c*, 1.6) (100 Mg.



required 11.4 c.c. *N*/10-aqueous iodine. Calc.: 11.4 c.c.). In slightly acidified aqueous solution the substance exhibited an intense absorption band at λ 245 $m\mu$, ϵ 10,000, for a solution containing 2 mg. per 100 c.c. (Found: C, 41.0; H, 4.8. Calc. for $C_6H_8O_6$: C, 40.9; H, 4.6%). It was identical in all physical and chemical properties with the natural material supplied to us by Professor Szent-Györgyi and obtained by him from either adrenal cortex or paprika. It will be seen from the account below that the synthetic material has the same antiscorbutic activity as the natural substance.

The synthetic product was examined for its antiscorbutic activity by the prophylactic method in 0.25 mg. and 0.5 mg. doses. The results were compared with those previously obtained with the natural acid. A number of samples of natural ascorbic acid of high purity have been tested in this laboratory (Lister Institute) during the last two years, and under the conditions observed, the degree of protection from scurvy obtained by the various doses was found to be reproducible. Guinea-pigs receiving the lower dose grow for about 19—23 days, and the weight is then usually maintained until the end of the test. In some cases the weight may fall a little after reaching the maximum and then remain at a lower level. This is usually the case with animals which show restricted growth during the first 3 weeks. Well-declared scorbutic symptoms appear about the time when the maximum weight is reached and persist during the entire period of the test. At the *post mortem* examination after the conclusion of the test, marked signs of scurvy are invariably found in this case.

With the higher dose, fairly good growth is obtained during the entire period of the test. In some case symptoms of scurvy, which are mostly of an intermittent nature, appear about the 25th day. At the *post mortem* examination no, or very insignificant macroscopic, signs of scurvy are observed.

In this test the ascorbic acid was weighed out and dissolved in previously boiled distilled water daily immediately before administration. The test began with three guinea-pigs on each dose, but one animal succumbed to an intercurrent disease after 33 days, showing very slight signs of scurvy at autopsy. The figures give a graphic representation of the results as well as of representative ones obtained with an analytically pure specimen of natural ascorbic acid, m. p. 192°, $[\alpha]_{D}^{20} + 24^\circ$ in water (*c*, 1.5) (1 mg. of this required 1.14 c.c. *N*/100-iodine). Animals on this product which showed the same vigour of growth during the initial stages of the test as that shown by guinea-pigs employed for the assessment of the activity of the synthetic product, were chosen for comparison. Both samples of ascorbic acid show the same degree of antiscorbutic potency.

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