

## Vitamin P

WE reported in our previous notes<sup>1</sup> on the vitamin nature of phenyl-benzo- $\gamma$ -pyrone dyes, and have described a method for the experimental demonstration of this activity. Using this method, we tested the following substances for their vitamin activity: hesperidine (m.p. 261°), an impure sample of demethylo-hesperidine (mother liquor of 'citrin') and quercitrine, 1 mgm. being given daily.

The experiment consisted of seven groups of 20 guinea pigs each. One of these groups received the basal diet only. The other groups received in addition: hesperidine, demethylo-hesperidine, quercitrine, ascorbic acid (2 mgm.), ascorbic acid plus hesperidine, ascorbic acid plus demethylo-hesperidine.

All three groups receiving ascorbic acid equally showed normal growth. The animals receiving hesperidine, or demethylo-hesperidine only, behaved in the same way as the animals of our previous experiments receiving 'citrin'. The animals receiving the basal diet only or this diet and quercitrine showed severe scurvy and died after a sharp fall in weight on about the twenty-eighth day.

These results admit of the following conclusions: experimental scurvy, as commonly known, is the symptom of a mixed C and P avitaminosis. Pure C avitaminosis can be observed, if in addition to the basal diet vitamin P is administered. The pure P avitaminosis has no clinical symptoms. If, however, vitamins C and P are simultaneously withheld, the lack of P will greatly modify the pathological condition.

There is a great difference in the activity of different phenyl-benzo- $\gamma$ -pyrones. Since the only essential difference in the formula of quercitrine and hesperidine is found on the C<sup>2</sup> and C<sup>3</sup> atoms, it can be concluded that these atoms are of special importance for the activity. Changing the flavanone hesperidine into the corresponding flavonole entails inactivation.

The therapeutic effects observed after the administration of 'citrin' in man in septic conditions, also accompanied by polyarthritis and endocarditis, suggest that the age-old beneficial effect of fruit juice is partly due to its vitamin P content.

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<sup>1</sup> NATURE, 133, 798 (Nov. 7, 1936).