

mobilized reserve has a relatively high calcium-phosphorus ratio (there is evidence that the ratio, under certain conditions, may be infinitely high, that is, that calcium may be withdrawn without a corresponding withdrawal of phosphorus), while the less readily mobilized reserve has a relatively low calcium-phosphorus ratio. The chief source of bone calcium for the first egg of a clutch is the more readily available reserve, whereas the relatively less available reserve is drawn upon to a progressively greater degree for the succeeding eggs of the clutch.

It is too early yet to link up the differences in porosity with this conception of different types of bone calcium, but the possible connexion should be borne in mind when attempts are made to explain these porosity changes.

It is hoped to publish a fuller account of this work at a later date.

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### Effects of X-Rays on Erythrocytes Irradiated *in vitro*

IRRADIATION of erythrocytes with X-rays *in vitro* causes hæmolysis. The dose of X-rays required to obtain complete hæmolysis is influenced by the concentration of the erythrocyte suspension and by the medium. A state of resistance to hæmolysis results when a dose of two million r. is given to an erythrocyte concentration of 0.1 per cent or less in normal saline<sup>1</sup>. The question arises, whether these erythrocytes are resistant to other hæmolysins or only to the X-rays producing this stable state.

To answer this question, experiments were undertaken in which erythrocytes made resistant to hæmolysis by X-ray irradiation were exposed to the hæmolytic effect of light and saponin respectively.

(1) Human or rabbit erythrocytes in 0.1 per cent suspensions in normal saline in hanging drops under mica slides were irradiated with doses of 2 million r (35 kV. 15 milliamp. copper anode 3 cm. distance). After 24 hours there was no hæmolysis. Then after addition of eosin solution to the irradiated drops and to non-irradiated control drops both were exposed to sunlight. Hæmolysis occurred in the control drops after 10–20 min., while in the X-irradiated drops no hæmolysis took place after 1–2 hours.

(2) Solutions of saponin were added in different concentrations to erythrocytes prepared and irradiated in the same manner as in the foregoing experiments. In non-irradiated control drops, addition of one drop of saponin solution (1 : 15,000) caused hæmolysis in about 5 min., while concentrations of 1 : 3,000 were not hæmolytic to the pre-irradiated erythrocytes after 24 hours.

The results of these experiments suggest that two different effects of X-rays on erythrocytes are possible, one of which causes complete hæmolysis, whereas the other, on the contrary, causes the erythrocytes to become resistant to the hæmolytic effect of X-rays, light or saponin.

Whether one or the other effect takes place depends on the concentration of the erythrocyte suspension in normal saline and the dose of X-rays. The resistance to hæmolysis fails to appear if serum is added to the normal saline or if the erythrocytes are irradiated in glucose solution.

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<sup>1</sup> Halberstaedter, L., and Goldhaber, G., *Proc. Soc. Exper. Biol. and Med.*, December 1943.

### Vitamin C in Plants

#### 'Nasturtium' (*Tropaeolum majus*)

THE nasturtium, *Tropaeolum majus*, a native of Peru, flourishes throughout New Zealand. The leaves, which are used as a salad food, are very rich in vitamin C, the concentration ranging from 200 to 465 mgm. per 100 gm. in the samples tested. As a rule, the leaves of any particular plant show much less variation than this, although small leaves tend to have higher values than large leaves. Stalks contain 100–160 mgm. per 100 gm. and are therefore also a rich source. Little or no dehydroascorbic acid is present, although the ascorbic acid oxidase is exceedingly active in disintegrated tissues.

The ascorbic acid was titrated visually in 1 per cent metaphosphoric acid extracts with dichlorophenolindophenol solution. That the reducing properties of the extract are correctly attributed to ascorbic acid is proved by the rapid enzymatic oxidation which takes place in extracts unless prevented by boiling, or addition of metaphosphoric acid, etc. Also, a 60 per cent yield of pure dinitrophenyllosazone of dehydroascorbic acid was obtained from an extract made with boiling water, oxidized with iodine and treated with dinitrophenylhydrazine.

An extract for addition to the diet of babies is readily prepared by adding nasturtium leaves to boiling water until no more can be immersed, boiling three minutes longer and draining. This extract normally contains more than 150 mgm. of ascorbic acid per 100 ml., and sealed away from air is fairly stable. It has not the pungent taste of the fresh leaves, this being lost during the boiling.

The nasturtium is a particularly suitable plant for investigation of ascorbic acid distribution, synthesis, etc., and merits more detailed study.

I wish to thank Dr. Guy Chapman for the suggestion that the nasturtium should be examined for vitamin C, and also Mr. K. Griffin, Government analyst, Auckland, for his interest and encouragement.

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#### Iris (*Iris germanica*)

THE communications that have appeared in NATURE during the past few years in which rose hips, pine needles, etc., have been suggested as sources of vitamin C, prompt me to direct attention to the leaves of the common European iris (*Iris germanica*) as a superior material from which this vitamin can