in the output of creatine, creatinine and total nitrogen, when these animals were compared with controls similarly treated, but fed soluble starch alone or combined with maltose or lactose in amounts equivalent to the salep administered. There was a faint tendency for creatine and total nitrogen to fall in the starch period, but the results cannot be considered conclusive.

Salep resembles inulin in its ease of acid hydrolysis, its resistance to digestive enzymes, and its failure to form sugar in the diabetic organism. It is not so fermentable as inulin.

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Growth and reproduction upon simplified food supply.

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Rats were fed rations consisting of white bread (made without milk or butter) either alone or with only one other article of food. Later, ground whole wheat was substituted for white bread in several cases.

In preliminary experiments with animals placed upon the experimental rations at the time of weaning, bread alone resulted in cessation of growth at once and death after about six weeks. With bread and meat there was some growth at first, but the survival period was only slightly longer than with bread alone; with bread and apple there was no growth, but the survival period was considerably longer; with bread and turnip there was continuous slow growth; with bread and milk there was continuous growth at a normal rate. In this case the bread and milk ration consisted of equal weights of fresh bread and market milk, making a food mixture in which the white bread furnished four fifths and the milk one fifth of the total calories. On this ration young rats of both sexes (taken at weaning time from mothers which were receiving mixed food) made normal growth and the males were capable of normal reproduction but the females usually failed to breed and none of them raised any young.

On a ration containing the same proportion of milk (about

one fifth of the total calories) but with whole wheat instead of white read or patent flour, young were successfully suckled (though at the cost of considerable loss of weight on the part of the mother) and are growing at somewhat less than the average rate.

When about two fifths of the total calories were supplied by milk and the rest by whole wheat, the mother has suckled the young without undue loss of weight and the young have made a fully normal rate of growth.

When the market milk used has been replaced by dried milk, or when it has been incorporated into the bread in bread-making and, therefore, subjected to the heating involved in the baking of the bread, there has been no evidence of any serious destruction of either "fat-soluble A" or "water-soluble B." Since the experiments were made upon rats, they would, of course, throw little if any light upon the destruction of the antiscorbutic vitamine. We plan to continue the study of the effects of heating upon the vitamines in some of the staple articles of food.

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The rate of change of hereditary factors in Drosophila.

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A knowledge of the rate at which hereditary changes of various sorts occur is the necessary groundwork for an adequate understanding of evolution. The wide recognition given to this fact is attested to by the vast amount of literature on the subject of "variation," but, with our new exact knowledge of the Mendelian and chromosomal method of inheritance of the so-called "variations," it is evident that this literature has very little bearing on the real question of how often changes in the hereditary factors, *i.e.*, mutations, actually occur: for the breeding procedures used in the experiments there considered were not of the type necessary for ferretting out the new mutant factors as they arise, and for distinguishing between them and the apparent variations