

other changes mentioned above, that follow upon long exposure to the free HO ions.

If these ions are responsible for the ageing one should be able to age eggs precociously with hyperalkaline sea water and on the contrary one should be able to retard ageing by rendering sea water neutral. Such experiments were made and made repeatedly. Eggs were aged precociously and showed all the physiologic and developmental changes which I have shown were characteristic of overripe eggs, and on the contrary ageing was retarded by removing the excess HO ions.

The longevity of the eggs was increased either by a reduction of respiration by KCN as proposed by Loeb, Lyon and others, or by the elimination of the excess free HO ions of sea water.

Other changes in ageing eggs were studied, such as the metabolism of the eggs, and the later developmental changes, but these studies will be reported later.

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#### **The influence of thyroidectomy on the blood sugar.**

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Considerable uncertainty exists with regard to the relation of thyroid function to carbohydrate metabolism. Some writers report a decrease, others, an increase of alimentary sugar tolerance after thyroidectomy in the dog. This confusion is due to several causes. Injury to the parathyroid bodies, which probably exert a different effect on metabolism from that of the thyroid, has frequently not been excluded. Previous experiments are open to other technical criticisms. The observations have been chiefly confined to urinary examinations.

Accordingly, a study of the blood sugar was made before and after thyroidectomy in a series of dogs. The operations were performed by Dr. J. E. Sweet. At least two parathyroids were isolated in each case. The wounds healed aseptically, and the dogs remained free from tetany. The blood sugar after thyroidec-

tomy showed a marked decrease, averaging about 25 per cent. less than the normal value. The feeding of  $6\frac{1}{2}$  grams of glucose per kilo in 40 per cent. solution before the operation to fasting animals showed the normal hyperglycemia to last three hours. After thyroidectomy, glucose fed under the identical experimental conditions, failed to raise the blood sugar to the level attained before the operation. The increase persisted however for an average of five hours. The urine remained free from glucose both before and after the operation with a single exception.

We have observed hypoglycemia in cretinism. It is present in myxedema, in Addison's disease, and after removal of the suprarenal bodies. Evidence is accumulating showing that a persistent low sugar content is a sign of insufficient internal secretion.

Quite aside from the doubtful question of whether increased alimentary tolerance to glucose can be demonstrated by an examination of the urine, these experiments show that there is less tendency to hyperglycemia on carbohydrate ingestion after thyroidectomy. It seems therefore, that the removal of thyroid tissue might lower the blood sugar also in diabetes mellitus, possibly with beneficial results.

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**Further observations on the influence of diet on the toxicity of sodium tartrate.**

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In a previous publication from this laboratory<sup>1</sup> it was stated that the toxicity of sodium tartrate might be modified by diet. Rabbits that were fed carrots resisted larger doses of the tartrate than those which received oats and cabbage. The investigation of the effect of diet on the toxicity of this substance was resumed recently. The observations were made on rabbits and on cats with a large number of diets which were given some time previous to the subcutaneous injection of tartrate. Striking differences in toxicity were observed. When young carrots were fed four days

<sup>1</sup> Salant and Smith, *Am. J. Physiol.*, 1914, 35, 239.