EVIDENCE THAT CATALASE IS THE ENZYME IN ANIMALS AND PLANTS, PRINCIPALLY RESPONSIBLE FOR OXIDATION.

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We have found that whatever increases oxidation in the animal produces an increase in catalase, an enzyme possessing the property of liberating oxygen from hydrogen peroxide, by stimulating the alimentary glands, particularly the liver, to an increased output of this enzyme, and whatever decreases oxidation produces a decrease in catalase by diminishing its output from the liver and by direct destruction.

The food materials were found to stimulate the liver to an increased output in catalase parallel with the increase they produce in oxidation, the proteins being more effective in this respect than the fats or carbohydrates, in keeping with the fact that protein is more effective in increasing oxidation. The ingestion of saccharin was found to increase catalase and in this way may serve as a food material.

In exophthalmic goiter, a disease in which there is a hypersecretion of the thyroids, it is known that there is a great increase in oxidation in the body. We found that when desiccated thyroid is fed to an animal, it stimulates the liver to an increased output of catalase, which suggests that the increased oxidation in exophthalmic goiter may be due to the increase in catalase brought about by the hypersecretion of the thyroids. It was also found that the catalase content of the tissues was greatly decreased in diabetes, a disease in which oxidation is defective. The decrease in this enzyme may be the cause of the defective oxidation.

The narcotics were found to decrease catalase parallel with the decrease they produce in oxidation by diminishing the output of this enzyme from the liver and by direct destruction. A strong narcotic, such as chloroform, was more effective in this respect than a weaker narcotic, such as ether. A rapidly acting narcotic, such as nitrous oxide, decreased catalase very quickly, while

a slowly acting narcotic, such as magnesium sulphate or morphia, decreased catalase very slowly.

In the plant kingdom, it is known that whatever increases oxidation also produces an increase in catalase, and whatever decreases oxidation in the plant decreases catalase. This parallel relationship suggests that catalase may be the enzyme in plants also principally responsible for oxidation.