nature, the method of investigating them has departed somewhat from the paths usually followed in determining the composition, effects and rôle, of organic combinations in vegetable and animal organisms. The nature of the enzym is still a matter of much doubt. Of their action we are more sure, and it is along this line that we have become familiar with the nature of some members of this very interesting group of compounds. The rôle of the enzym in the life processes may also in some cases be defined with certitude.

Beginning with a few, the study of unorganized ferments has brought to light many others. Out of the growing number some are already put to important uses, while others bid fair to become of great value to many industries. Dr. Oscar Loew in his studies on tobacco (Rpt. No. 68, Div. of Veg. Phy. and Path. U. S. Dept. of Agr.) goes further in the study of unorganized ferments than ascribing to one a special rôle and shows the general distribution and seeks a reason for its existence of an enzym, to which he gives the name catalase.

In the work with this enzym, in which the writer took some part, the most striking characteristics were its very general dissemination, its persistence, and its ability to break down hydrogen peroxid. In the examination of a large number of animal and vegetable organs this enzym was found present, in greater or less amount, in every instance. Its differentiation from other unorganized ferments is established by a large number o tests with various reagents. Among other characteristics it was found to be more persistent than any other known enzym. This was especially noted in dried vegetable substance as seeds and leaves, being found present in a herbarium specimen of the latter examined after a lapse of over 50 years.

The ability of catalase to break down hydrogen peroxid appeared to be its most striking peculiarity, and this led the author to believe that it might perform such a service in the phenomena displayed by living matter. Tests go to show that it belongs to the class of oxidizing enzyms and its very general occurrence and uniform actions indicate that it plays some important rôle in physiological processes.

From his studies the author gives the following as the most plausible explanations of the action of catalase in vegetable organism: (1) It destroys instantly the hydrogen peroxid, probably formed in cells during the oxidation caused by the respiration process; (2) it loosens chemical affinities in certain compounds so that the protoplasm can more easily split or oxidize them. "In other words, catalase might represent an aid for fermentative as well as for respirative phenonomena." D. W. May.

U. S. Department of Agriculture.

### TOADS KILLED BY SQUASH-BUGS.

During the past summer the Entomological Department of the New Hampshire College Agricultural Experiment Station carried on investigations on the common squash-bug (*Anasa tristis*), which has been so abundant in some portions of the State the past season. Mr. Kirkland, in Bulletin 46, Mass. Agr. Exp. Sta., recorded the bug to have been found in the stomach contents of toads; Mr. Chittenden, in Bulletin 19, 1899 (New Series), U. S. Dept. Agr., states that Dr. Judd likewise found a bug in a toad's stomach. This suggested that the toad is probably an enemy of the squash-bug, and experiments, made to determine this, showed the following interesting results: When a squash-bug nymph o the fifth stage was suddenly introduced into a half pint, open, wide-mouthed specimen jar containing a half grown live toad, so that the Batrachian would get the full effects of the pungent fumes given off by the bug, the toad was thrown into a temporary stupor, the effect being similar to that of chloroform. As the number of bugs was increased the effect on the toad was increased. When as many as seven bugs were introduced the toad fell into a profound stupor and died in the course of twenty-four hours.

On September 8, an adult, that had been kept in the laboratory vivarium with a scant food supply for several days, was placed in a quart jar of the same construction as the one mentioned above, and eight bugs were introduced; these bugs, however, had been so much disturbed previously that the source of the pungent secretion had been temporarily exhausted. The toad hesitatingly devoured three, after

which she would remove with her front feet every specimen that made an attempt to ascend the wall of her enclosure; but these bugs were not eaten. The toad was then transferred to another jar of the same size and construction and eight bugs were suddenly introduced from the squash leaf so that the toad would get the first and fullest effects of the odor; the result was that the animal went through a series of contortions followed by a short period of stupor similar to that mentioned before. Upon recovery the toad was again removed to the vivarium where it now lives in partial hibernation.

A young red spotted salamander was affected and killed as easily as the half-grown toad, while for the common field frog a greater number of bugs were required to bring about similar effects, the frogs also being killed. Many experiments with snakes were tried, but no ill effects from the secretion of the bugs were apparent.

The odor that the bug gives off emanates from a clear, slightly greenish liquid expelled from the extremity of the alimentary canal; when it comes in contact with the air the odor is given off almost instantaneously while the liquid remains to evaporate.

These experiments are still in progress and when completed will be published in detail. They seem to open up an interesting field for investigation as to the protective value of the odoriferous secretions of many of the Heteroptera.

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NEW HAMPSHIRE COLLEGE AGRICULTURAL EXPERIMENT STATION, DURHAM,
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## *CURRENT NOTES ON METEOROLOGY.*

### THE WEATHER BUREAU.

THE address presented at the Convention of Weather Bureau officials, held at Milwaukee last August, by Professor Willis L. Moore, Chief of the Weather Bureau, is printed in the October number of the *National Geographic Magazine*. The salient facts in the history of the weather service are given, and special emphasis is laid on the tangible results of the Weather Bureau's work. It is a pleasure to see the name of Professor Cleveland Abbe, the foremost living American meteorologist, linked with the names of Redfield, Espy, Maury and Loomis in this article. Some of the statistics given by Professor Moore are worthy of note here. Thus, in the case of cold-wave warnings, the statement is made that 100,000 telegrams and messages are frequently distributed within a few hours. During one cold wave $3,400,000 worth of property is estimated to have been saved as a result of the information issued by the Weather Bureau. The system of distributing warnings of gales dangerous to navigation is so perfect that "the Chief of the Weather Bureau, or the forecaster on duty at the Central Office, can dictate a storm warning and feel certain that inside of one hour a copy of the warning will be in the hands of every vessel master in every port of material size in the United States, provided that it is his desire that a complete distribution of the warning be made."

Reference is made to the important work of the Bureau in connection with measurements of snowfall in the high mountains of Montana, Wyoming, Idaho, Utah, Arizona and New Mexico, which make it possible to estimate the probable supply of water to be expected for irrigating purposes, and also to the recently inaugurated forecasts of wind direction and velocity for a period of three days after steamers sail from European or North American ports. At the conclusion of his article, the Chief of the Weather Bureau rightly criticizes the press for the attention it gives to the long-range forecast frauds, which deceive so many persons. Last year's appropriation of $1,058,320 for the Weather Bureau was certainly small, considering the value of the work done.

### MONTHLY WEATHER REVIEW.

THE *Monthly Weather Review* for July (issued in October) contains the usual number of interesting articles. In 'The Thunder-storm: A New Explanation of one of its Phenomena,' Byron McFarland gives his reasons for not accepting the common explanation of the origin of the squall wind in thunder-storms, viz., that this squall is due to the 'kick' of the rapidly ascending air, and advocates the theory that the cool air within the thunder-storm accounts for