trehalase have the same function in mushrooms as *sucrose* and *invertase* perform in chlorophyll-containing plants, in that they may be involved in the hydrolysis or synthesis of the higher carbohydrates.

In 1876 Müntz[6] looked for trehalose in brewer's yeast, thinking that since it was so generally present in higher fungi it should also be found in the lower fungi such as yeasts. His several attempts to separate it from the water and alcohol extracts of yeast were a failure. He concluded that either this sugar does not exist in yeast, or that the large amounts and the diversity of other soluble substances present therein make its separation from the solutions impossible.

The present discovery of trehalose in an alcohol extract of baker's yeast was due to the comparative freedom from impurities, the relatively high concentration of trehalose and the fact that the solution stood undisturbed for a long time. It was under similar conditions that the same sugar was first found by Wiggers[3] in a water solution of rye ergot.

The alcohol extract of yeast from which trehalose was separated was slightly acid. It is a question whether it exists in the yeast cell as such or is a hydrolysis product formed during the long extraction process.

A similar extract of yeast added in small amounts to a medium in which yeast is growing increases to a marked extent the invertase content of the yeast grown.[6] It is possible that trehalose is responsible for such an effect on enzyme formation. This question is being investigated.

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THE ALKALINE REACTION OF THE DEW ON COTTON PLANTS

SINCE the presentation of a paper by me at the meeting of the American Chemical Society, New Haven, Connecticut, April, 1923, and its publication in the *Journal of Agricultural Research,*[1] under the title "Excretions from leaves as a factor in arsenical injury to plants," two communications upon certain points of this paper have appeared in SCIENCE, which seem to require on my part a few words of explanation.

The first point is one of chemical fact—whether the alkaline earth carbonates are or are not alkaline to phenolphthalein.

Mr. J. E. Mills (SCIENCE, September 19, 1924) states that, "Mr. Smith seems to think that there is something in his analysis of the dew, showing calcium and magnesium carbonates and bicarbonates, to account for the alkalinity observed. Since both acid and normal alkaline earth carbonates are neutral to phenolphthalein this would hardly seem possible." Power and Chesnut (SCIENCE, October 31, 1924) repeat part of this statement in the following words, "Mr. Mills has now noted (*loc. cit.*) that it would hardly seem possible that the alkalinity of the dew can be attributed to these compounds." The words "these compounds" as used are rather indefinite in meaning, but they must refer to the carbonates or bicarbonates or both, since those were the only salts to which Mills' statement applied. It is very easy to show that calcium carbonate, at least, is alkaline to phenolphthalein, as the reagent material, and even Iceland Spar, when powdered, will readily color an aqueous solution of that indicator.

Since calcium carbonate is a salt of a moderately strong base and a very weak acid, it hydrolyzes when dissolved in water, as the result of which the solution contains not only calcium and carbonate ions, but also bicarbonate and hydroxyl ions, the formation of which may be illustrated by the equation $\overset{=}{CO_3} + H_2O = \overset{-}{HCO_3} + \overset{-}{OH}$ The hydroxyl ions so formed are evidently sufficient in number to redden phenolphthalein. The question of equilibrium in solutions of lime and carbon dioxide has been thoroughly treated by Johnston and Williamson.[2]

Mills, after stating that the carbonates and bicarbonates of the alkaline earths could hardly explain the alkalinity, suggested that an alkali carbonate would suffice to do so. As a matter of fact I collected a sample of dew from cotton plants at Tallulah, Louisiana, subsequent to the work reported in my paper, and submitted it to the Insecticide and Fungicide Laboratory, Bureau of Chemistry, in July, 1923, for a more complete analysis than my limited facilities at Tallulah permitted. This sample was analyzed by Mr. J. J. T. Graham, who found potassium present equivalent to 252 parts of K_2O per million. The presence of potassium carbonate in the dew, along with other salts, can therefore be considered possible. In this connection it may be of interest to note an article, which later came to my attention, entitled "Die Secrettropfen an den Laubblättern von *Phaseolus multiflorus* Willd. und der Malvaceen," by A. Nestler.[3] Nestler found that *Phaseolus multiflorus* Willd. and several species of Malvaceae—cotton was not included among those investigated—secreted drops of liquid which were usually alkaline to phenolphthalein

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[9] Miller, E. W., *J. Biol. Chem.*, Vol. 48, 329 (1921).

[1] Vol. 26, No. 4, p. 191, October 27, 1923.

[2] *J. Amer. Chem. Soc.*, Vol. 38, No. 5, pp. 975–983.

[3] *Berichte der Deutschen Botanischen Gesellschaft*, Vol. 17 (1899), p. 332.

and which were found to contain carbon dioxide and potassium. On this basis, he considered that potassium carbonate was present, but because the phenolphthalein color was not always marked at first but developed on standing he suggested the possibility that bicarbonate is excreted and changes, by loss of CO_2, to carbonate. He states that with *Phaseolus multiflorus* "a small quantity of calcium carbonate was found."

The second point to be considered is the *cause* of the alkalinity of the dew.

Mr. Mills' assumption, as expressed in the first sentence in the quotation I have made from his article, is correct to the extent that I considered the presence of calcium and magnesium carbonates and bicarbonates to be at least consistent with the alkaline reaction. The statement of Power and Chesnut that I "was led to conclude that its alkalinity was to be attributed to the presence of the bicarbonates of calcium and magnesium" is not in accord with my original article. The only statement made therein concerning this point, which these writers quote in part, was "the dew gave a reaction alkaline even to phenolphthalein, indicating the presence of soluble hydroxide or salts of very weak acids." This statement was made designedly for the very reason that I did not care to express an opinion as to the specific causes of the alkalinity. The carbon dioxide was found by qualitative tests, but its form was estimated by titration as in water analysis and the alkalinity to phenolphthalein was taken as evidence that some of it was present as carbonate.

That other reacting materials are present, Power and Chesnut have proved by demonstrating the existence in the dew of ammonia and trimethylamine. The presence of these compounds is also consistent with the alkaline condition, but as to whether they or the carbonate constituents are the chief cause of the alkalinity is a point still to be determined.

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THE SPRING MEETING OF THE EXECUTIVE COMMITTEE

THE regular spring meeting of the executive committee was held at the Cosmos Club in Washington on Sunday, April 26, there being three sessions, which are reported below.

Forenoon Session.—The session came to order at 10:30, with the following members present: Cattell, Fairchild, Humphreys, Kellogg, Livingston, Noyes, Pupin, Ward, Wilson. Dr. Duggar was absent with valid excuse. The following are the main items of business transacted:

(1) Dr. Cattell was unanimously elected permanent chairman of the Executive Committee.

(2) A resolution was adopted heartily favoring the project to establish a National Museum of Engineering in Washington.

(3) On account of the vacancy occurring in the membership of the executive committee, Dr. F. R. Moulton, of the University of Chicago, was unanimously elected to be a member of this committee for the remainder of the present year. (The term of Dr. Humphreys, now general secretary, was to expire at the end of the Kansas City meeting and Dr. Moulton's election is to complete that term.)

(4) On account of the resignation of Dr. F. G. Cottrell as vice-president for Section M (Engineering) and upon due nomination by the section committee, the permanent secretary was instructed to cast the ballot of the executive committee for Dr. C. R. Richards, president of Lehigh University, to be chairman of the section and vice-president for the section for the current year.

(5) There were elected to fellowship 770 members, distributed among the sections as follows: A, 13; B, 51; C, 19; D, 14; E, 113; F, 128; G, 150; H, 6; I, 1; K, 2; L, 2; M, 122; N, 116; O, 33. (No elections to fellowship had occurred for over a year and the section secretaries had been asked to make a study of their section membership lists with the aim of securing the nomination of members eligible to fellowship but not previously elected. The large number of elections at this time was due mainly to the activity of the section secretaries in this connection.)

(6) The permanent secretary was instructed to present to the executive committee by a mail ballot nominations for fellowship that may be duly approved and sent in by section secretaries before the going to press of the new membership directory, now in preparation, to the end that the committee may act on such nominations in time for the records to be corrected before the directory is printed.

(7) The Georgia Academy of Science, the Indiana Academy of Science and the North Dakota Academy of Science were elected to affiliation with the association, on the basis of the new affiliation arrangement adopted at the fifth Washington meeting.

(8) On its application, the American Society of Parasitologists was elected to official affiliation with the association. According to lists supplied by the society, it has 144 members, 88 of these being members of the American Association, including 49 fellows. The society is therefore to have one representative in the association council.

(9) On its application, the History of Science So-