ballyhoo, the book was enthusiastically received by nature lovers and by many who had never heard before of its author. It went into a second edition, and an index was added. I believe it was advertised chiefly by word of mouth, the ideal way for news of a good book to spread.

Last year (1937) the Harvard Press followed "October Farm" with another volume from the Brewster journals called "Concord River." This was illustrated by a dozen plates, some in color, by the artist Frank W. Benson, who also had been a friend of Brewster's. The American Institute of Graphic Arts selected "Concord River" as one of the "Fifty Books of the Year" in its 1938 exhibition of American bookmaking.

The great simplicity and genuineness of these books are almost unbelievable in this day and age. They are books of the earth, but not of man's world. The entry for April 16, 1912, the day after the *Titanic* sank, reads:

> I saw two Great Blue Herons flying over the Farm towards the northeast at an elevation of fully a *mile*, one following closely in the wake of the other. For the most part they flapped their wings steadily and ceaselessly but twice I saw one of them sail for the distance of a few rods on set wings.

The same day he noted a flock of 36 Canada geese flying so high that they appeared no larger than bluebirds. "Rarely have I witnessed anything of the kind so impressive." Instead of man's noisy doings, Brewster wrote of bird songs, the tracks of foxes, the beauty of snowstorms, woods smoke and his beloved river. Thomas Barbour refers to him as the "modest and peerless recorder" and "utterly impersonal." "He wrote with no 'mission' in mind but simply because he had a warm, irrepressible urge to observe nature and set forth what he had seen but not what he thought about it."

Brewster's standing as a scientist probably will rest on his many other works and technical papers on ornithology, but as New England's great outdoor naturalist it will depend largely on the diaries and journals he left, and a most generous sampling of them has been given to us in the three volumes here described.

The details of Brewster's life have been adequately recorded elsewhere,[1] and my purpose here is merely to remind naturalists everywhere of these new chapters that have been added to the rich body of New England's natural history. Perhaps I may be pardoned if I add here my sonnet called "William Brewster: Man of Concord," which appeared originally in the *Washington Post* as a "review" of the book "Concord River." I believe it tells in another way what manner of man he was and why New Englanders should be proud that he was theirs.

> There by the river's bend he had his place.
> New England hills and hollows, fields, and springs
> Belonged to him, and he had sight and space
> To see uncommonness in common things.
> Up and down the Concord, paddling his canoe,
> He sought out nature's secrets like a sleuth;
> The flutter of a bird was oft a clue
> To bring him beauty and to show him truth.
>
> For serving God his meed was great and good:
> He touched a trembling vireo; unheard
> He watched a fox's cunning in the wood;
> To him the robin's rapture was transferred.
> How many men like Brewster do you know,
> Who'd find it joy to let a weasel go?

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[1] Sketch by Henry W. Henshaw in *The Auk*, January, 1920; and biography by Dr. Witmer Stone in the Dictionary of American Biography.

THE FERMENTATION TEST FOR THIAMIN

SCHULTZ, Atkin and Frey[1] refer to a note published in SCIENCE[2] from this laboratory and deny the implication that their fermentation test involves the *growth* of yeast. Such implication, if present in the note referred to, was erroneous. It is true, of course, that growth and fermentation can be dissociated (as has been done in the fermentation test), but on the other hand under many laboratory conditions they are closely related; so much so that the discovery of the *growth* essential "bios" by Ide[3] (Wildiers[4]) was based upon a *fermentation* test. The vitamin test of Bachman (1919) was likewise based upon fermentation (during growth). Substances which stimulate growth need not necessarily influence fermentation, but they often do so.

Our questioning of the specificity of the fermentation test for thiamin was based partly on experiments which may have involved cleavage products of the vitamin.[5] If this is so, it has been cleared up by the discoverers of the fermentation test.[6]

Other objections which are perhaps not crucial are based upon the fact that substances other than thiamin, notably pantothenic acid, and nicotinic acid (discovered to be an interference by the originators of the method),[7] have an influence. Duplicating the author's conditions as nearly as is possible using the Warburg technic, we have found that pantothenic acid, by stimu-

[1] A. S. Schultz, L. Atkin and C. N. Frey, SCIENCE, 88: 547, 1938.
[2] R. J. Williams, SCIENCE, 86: 349, 1937.
[3] R. J. Williams, SCIENCE, 88: 475, 1938.
[4] E. Wildiers, "La Cellule," xviii, 313, 1901.
[5] R. J. Williams and R. R. Roehm, *Jour. Biol. Chem.*, 87: 581, 1930.
[6] A. S. Schultz, L. Atkin and C. N. Frey, *Jour. Amer. Chem. Soc.*, 60: 3084, 1938.
[7] A. S. Schultz, L. Atkin and C. N. Frey, *Jour. Amer. Chem. Soc.*, 60: 1514, 1937.

lating fermentation in the presence of thiamin, may increase the carbon dioxide production 10 per cent. If deficient yeast (grown on a medium which is nearly synthetic in character) is used, the effect of pantothenic acid on fermentation (without growth) is even much greater than that of thiamin. Under these conditions, which are admittedly not those prescribed by the authors of the test, β-alanine and ethanolamine also have definite stimulative effects.

Stimulation of yeast fermentation by liver extract (Lilly's 343) is vastly greater under the conditions prescribed than can be obtained by any amount of added thiamin. Under these conditions growth accompanies the fermentation. If conditions which permit growth are carefully avoided, this difficulty is minimized.

On the basis of further developments and recent work by the originators we are now more favorably inclined to the fermentation test for thiamin than formerly. Though subject to certain errors, we believe that as amended it may serve as a very useful tool.

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THE INFLUENCE OF SOME DIGESTIVE FERMENTS ON THE EXPERIMENTAL CROWN-GALL

IN our experiments we tried to repeat some of the very interesting experiments described by Ark.[1] That author has found that digestive ferments such as pepsin, papain and some other organic compounds had a very marked influence on the plant tumors caused by *Pseudomonas tumefaciens.*

For these experiments we chose 30 different crown-galls on Pelargonium inoculated with *P. tumefaciens,* strain "Bela" from the Lister Institute in London. Eleven tumors were treated with papain and eleven with pepsin. Eight were kept as controls. These enzymes were applied in powdered form and were placed in long narrow incisions where small sections of tumors had been cut away. From all control tumors similar sections of tissue were taken away. Then the galls were wrapped in Cellophane.

Six out of eleven tumors treated with pepsin deteriorated, one month after treatment. Five were left without any or only slight injury. Out of eleven tumors treated with papain three died off and nine were left partly or entirely intact. From the eight control tumors four died off in the same time as treated ones.

Therefore, our findings are not in complete agreement with those of Ark. We came to the conclusion that the enzymes like papain and pepsin are not always effective in the treatment of crown-gall. In some cases at least the mechanical injury of crown-gall may effect a total necrosis of the tumors.

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ALEPRIC AND ALEPRYLIC ACIDS, NEW HOMOLOGS OF CHAULMOOGRIC ACID

IN analyzing *Hydnocarpus wightiana* oil by the method described by us[1] the high optical activity and iodine numbers of the lower boiling fractions of ethyl esters indicated that there must be present at least one more optically active fatty acid besides those already known (chaulmoogric, hydnocarpic and gorlic[2] acids). By repeated vacuum fractional distillation of 100 liters of *H. wightiana* ethyl esters and fractional crystallization of the free acids we have finally succeeded in isolating two new homologs of chaulmoogric acid. There is still a third homolog present which we hope to obtain pure, but being a liquid acid, it is much more difficult to purify.

Because of their relationship to the therapy of leprosy we have named these two new acids alepric acid and aleprylic acid. Alepric acid is the next lower homolog to hydnocarpic acid, containing two carbon atoms and four hydrogen atoms less than the latter. The acid is solid at room temperature, melts sharply at 48° C. and has a high specific optical rotation (+77°). The melted acid, upon solidifying, forms characteristic, beautiful branching crystals rising high above the surface of the melt, similar to those already reported by us for pure chaulmoogric and hydnocarpic acids.[3]

Aleprylic acid is the next lower homolog to alepric acid, differing from it by C_2H_4. It crystallizes in the same characteristic manner as the other homologs. It melts sharply at 32° C. and has a very high specific optical rotation (+90°).

The bactericidal properties of these acids against *M. leprae* as compared with those of chaulmoogric, hydnocarpic and gorlic acids are now being determined.

The methods of separating these new acids with more detailed data concerning them and their ethyl esters will form the subject of a paper to be published elsewhere.

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[1] P. A. Ark, SCIENCE, 85: 364.

[1] H. I. Cole and H. T. Cardoso, *Jour. Am. Chem. Soc.,* 60: 614, 1938.
[2] *Ibid.,* 60: 612, 1938.
[3] *Ibid.,* 59: 963, 1937.