"CALIFORNIA BEES."*[1]

BY LYMAN F. KEBLER.

Synonyms: African bees, Ale nuts, Australian bees, "Balm of Gilead," Bebées, Beer bees, Beer seeds, Beer plant, Bees, Ginger Beer Plant, Ginger bees, Japanese Beer Seeds, and Vinegar bees.

INTRODUCTION.

More or less interest has been manifested in certain ferments under the above names for years in many parts of the world, but the Federal law regulating alcoholic products seems to have brought these and other alcoholic ferments more prominently to the attention of the public. Of late unusual interest has been directed to the so-called "home brews" and enterprising parties having knowledge of the above ferments seem to be very willing to supply these materials for a money consideration. In fact, active propaganda is engaged in through various media of publicity. The exploiting of such products through the mails as agents for making alleged Wines, or Beers, or Vinegars, or Cures, for various ailments should be carefully considered before engaging therein. The reasons for this observation will be considered later. Preparations made by these ferments are simply acidulous, effervescing, hydro-alcoholic, saccharine solutions of variable aroma, depending on the character of the initial material used, long known to the general public as will be shown in this article.

SOURCES OF THESE FERMENTS.

The origin of "California Bees" or similar products under the various synonyms is as obscure to-day as when first described over thirty years ago. The above synonyms indicate that these ferments are derived from various sources. They do not seem to have a common origin. Investigations show that, while the different specimens resemble one another in many respects, there appear to be fundamental differences. Bayley Balfour[2] exhibited specimens of so-called "Ginger-beer" Plant and states, "It is said the 'Ginger-beer' Plant was introduced into Britain by soldiers from the Crimea in 1855." Based on microscopic examinations Balfour considered the material similar, with some modification, to the Kephir so excellently described by E. Kern.[3] J. U. Lloyd writes,[4]

"I have been searching for material known in 1859 as 'Japanese Beer Seeds,' which at that date were used in my part of Kentucky for the making of a 'home drink.' The description given by Dr. Kebler demonstrates conclusively to me that the material to which he refers, is the long sought ferment of my earlier recollection. These 'Japanese Beer Seeds' were introduced into our part of Kentucky, if I remember correctly, through an eastern establishment. They came dried and looked much like some form of tapioca, or perhaps I might better describe their appearance as that of dried pulp of boiled rice. I may say that in my opinion the origin of this ferment is in the Orient."

[EDITOR'S NOTE:—For other recent papers on "California Bees," see JOUR. A. PH. A., 9, 570 and 571.]

* Read before Scientific Section A. Ph. A., New Orleans meeting, 1921.

[1] The author stated that the work on this subject is the result of investigation for the Post Office Department relative to improper use of the mails in connection with this product.

[2] *Proc. Linnean Soc.*, London, Jan. 20th, page 7 (1887).

[3] *Bull. Soc. Imp. Naturl.*, Moscou, 56 (part 2), 141 (1881).

[4] Private communication to the author, 1910.

Dr. P. F. Ellis[1] of Texas, writing on "California Beer Seed," says,

"Here is the way my wife has made the seeds for 25 years." It consists in mixing one ounce of finely bolted cornmeal or wheat flour with four ounces of sweetened water and let stand in a warm place for 48 hours, the liquid drained off and a pint of fresh sweetened water added to the sediment remaining in the bottom of the vessel. Fermentation soon begins and the small particles rise and fall with the production and liberation of the gas. The results with the wheat flour are slower than with the cornmeal.

"The writer[2] (G. W. Smith) of this note (On "Ginger Beer Plant") has also been tormented weekly, almost daily, on the same subject for two or three years. Every one has been asking him for the 'regular Latin or Greek name' of the 'Ginger Beer Plant.' Benevolent old ladies, clergymen and officers of the Blue Ribbon Army, have called upon him, or written for a scientific explanation, hoping to make the 'Ginger Beer Plant' a boon for the poor. One person wished to feed paupers with it; another hoped by its means to knock all the publicans on the head; a third to send it in barrels for the army in the Soudan. When such persons have been told it is merely a form of German yeast they have turned away disappointed and disgusted. Something more must evidently be done for this rum shrub, of which I have recently had application for slips, rooted cuttings, and seeds."

AMERICAN SPECIMENS EXAMINED.

Dr. Charles L. Mix was the first to report[3] scientific observations made on these agents. His results are based on two samples, received by Dr. Farlow of Harvard University, one in 1888 from Passaic, New Jersey, and the other in 1891 from London, Ontario, the latter under the name of "California Bees' Beer," with the note that "housekeepers through this country (Ontario) keep a self-sealing jar of this Saccharomycete half filled or more with sweetened water. The fermented product is drawn and drunk for a tonic." Regarding these samples Dr. Mix says:

"In both cases the specimens were in the form of rather small granules, very few being above a centimeter in diameter, of a dirty brown color, and presenting on their surfaces numerous lobes and fissures, thus reminding one of rather dirty gum-arabic. The material from New Jersey and that from Ontario were practically identical in gross and microscopic characters,****. When soaked for a time in water, the grains become whitish, very firm and compact, and quite elastic. Examination under the microscope shows them to consist of two elements, a small proportion of yeast cells embedded in zoogloea masses of rod-shaped Bacteria."

Dr. Mix called the samples "American Kephir" even though he found distinct differences between his specimens and the "Kephir" described by Kern.

The above harks back to the product known to Lloyd in Kentucky in 1859, Ellis in Texas in 1867, Smith in London, Eng., in 1882, Balfour and Ward, England, in 1887. Dr. Ransome says:[4] "Some say it was brought from Italy." A. Schneider reports[5] seeing it in the wood lake region of Minnesota in 1892. Dr. W. O. Emery states[6] that he heard of these "Bees" through the eastern Tennessee mountaineers about 1897. They were then used as starters of moonshine whisky. The writer about the same time[7] came into possession of BēBées in Philadelphia where the material was in quite common use. A specimen was received by H. Marshall Ward[8] from a lady in Paris through a missionary from Madagascar.

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[1] *Pharm. Era*, 8, 317, 1892.

[2] *Gardeners' Chron.*, 21 (N. S.) 542, 1884.

[3] "Proc. Am. Acad. Arts and Sciences," 26, 102, 1891.

[4] Private letter to Ward 1891; Phil. Trans. London, 183 (B) 125, 1892.

[5] *Drug. Circ.*, 65, 10, 1921.

[6] Personal communication.

[7] *Pharm. Era*, 42, 623, 1909.

[8] *Ann. Botany*, 11, 341, 1897.

THE CLASSIC INVESTIGATION.

Prof. Ward read[1] a paper in December 1891, outlining the nature of Ginger Beer Plant, but the details of his classic investigations of this substance were reported[2] one month later. The introduction of the excellently illustrated article reads in part as follows:

"In 1887 my attention was directed to a curious substance, or structure, popularly known in many parts of the country as the Ginger-beer Plant, from its association with the domestic manufacture of the well-known summer beverage so often purchased in villages and towns in various parts of the British Isles, where it is usually put up in brown stone bottles, with tied corks."

"I have obtained specimens from various sources in this country and abroad." (North America.)

"Total ignorance prevails as to the original source of the 'plant,' and very little indeed is known as to its real nature."

"All agree that it is handed on from family to family much in the same way as yeast or 'barm' is by brewers and bakers."

Under general description he says:

"In the fresh state it has the appearance of solid, white semitranslucent, irregular, lumpy masses, not unlike pieces of soaked sago or tapioca; these lumps are brittle like firm jelly and their size varies from that of a pin's head, or smaller, to that of a large plum, or larger****."

"The plant grows, and is alternately buoyed up and falls in the liquid."

"They (the villagers) make a solution of sugar corresponding roughly to a 10–20 percent solution in tap-water, in a large open vessel, a little cream of tartar and a few pieces of ginger are added."

This worker found the specimens to consist of heterogeneous mixtures, containing several species of yeast plant, bacteria and mould fungi. He points out the resemblance of the "plant" to Kephir. Ward found it possible to reconstruct the ferment from pure cultures of these separate organisms, isolated from a fermenting liquid.

C. V. Riley in a brief note[3] discussed "California Beer Seed," said to be "used with sugar and water for making domestic beer."

In 1897 Ward reported[4] additional observation on Ginger Beer Plant obtained as "an excrescence on the sugar cane." This specimen came from Madagascar. The action appeared to be due almost entirely to the bacteria as very little yeast was present. Ward noted that there evidently were several distinct varieties of the Ginger Beer Plant. Ward and J. Reynolds Green made[5] further extended observations on this sample. They say:

"It consists of a bacterium associated with at least one yeast, and grows in saccharine solutions, producing clumps so like the ginger-beer plant that the assumption seemed warranted that we had here a symbiosis of the same kind as that proved to occur there. In moderately strong solutions containing 15 to 20 percent of common sugar in water, the clumps referred to induce a powerful fermentation,****."

The action of the sample was tried out with a number of carbohydrates, in solution, both simple (cane sugar) and mixtures.

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[1] *Proc. Roy. Soc. London*, 50, 261, 1891.

[2] *Phil. Trans. London*, 183 (B), 125, 1892.

[3] *Pharm. Era*, 8, 271, 1892.

[4] *Ann. Bot.*, 11, 341, 1897.

[5] *Proc. Roy. Soc. London*, 65, 65, 1899.

Additional contributions on this class of ferments have appeared during the past two decades. Most of them confirm former findings or are of a résumé nature, or refer to certain claims and representations made for the beverage resulting therefrom. Among them may be mentioned J. Reynolds Green,[1] Correspondence note,[2] L. F. Kebler,[3] Erwin F. Smith,[4] U. S. Dept. of Agriculture,[5] E. M. Holmes,[6] L. K. Darbaker,[7] and A. Schneider.[8]

SOME KNOTTY PROBLEMS AHEAD.

As is indicated in the introductory portion of this article, new problems have developed rapidly during the past decade, and are now in progress of evolution, in connection with the Food and Drugs Act, the Postal Laws, the Prohibition Law and the United States Constitutional amendment covering alcoholic beverages. The question of using one branch of the Government as a vehicle for violating or threatening the enforcement of certain Federal laws is one that must arise in the minds of many readers in connection with the alcoholic beverages, produced by ferments of the California Bees type and certain therapeutic claims

In 1909[3] I called attention to the alcohol content and the medicinal claims made for some of the Bebée preparations. On referring to my notes made over twenty years ago, I find that the amount of alcohol by volume, for five different tests, varied from 5 to 9%, and the total acidity, calculated as acetic acid, varied from 1.2 to 2.5%. In 1903 additional experiments were carried out using various concentrations of aqueous molasses solutions. The highest amount of alcohol by volume obtained was 11.3 percent. The acidity, on the acetic acid basis, varied from .75 to 2.4 percent. In general the degree of acidity varied with the amount of alcohol.

Prof. J. U. Lloyd in 1910 carried out some experiments with "bees" sent him by the writer and reported that he was unable to get the alcohol above 3 percent. This represents a poor specimen. Several other specimens were tested out by the writer during the past two years. Not one was as good an alcohol producer as the specimens examined in former years. A sample of material exploited as "Vinegar Bees" was tried out to determine its vinegar-producing properties, with unsatisfactory results. No other observations seem to indicate that this mixture of organisms is especially adapted for producing vinegar.

Alcoholic preparations of the above type are not properly designated by such names as Beer or Wine or Vinegar.

Various therapeutic claims are made for these fermented products, such as tonics, stimulants, laxatives, anti-intestinal ferments, remedies for "kidney trouble" and "cures for rheumatism." Similar claims and representations were and are still made for other alcoholic preparations and may be found in lay publications and in certain medical literature. Some remarkable medicinal virtues have been

[1] "The Soluble Ferments and Fermentation," 2nd Ed., p. 342 (1901).
[2] *Pharm. Era*, 38, 106, 1907.
[3] *Ibid.*, 42, 623, 1909.
[4] "Bacteria in Relation to Plant Diseases," 2, 162, 1911.
[5] *Weekly News Letter* 4, Aug. 16, p. 3, 1916.
[6] *Pharm. J. and Pharm.*, 104, 4, 1920; *Am. J. Pharm.*, 92, 185, 1920.
[7] J. Am. Pharm. Assoc., 9, 510, 1920.
[8] *Drug. Circ.*, 65, 10, 1921.

ascribed to whiskey and accentuated of late in some quarters but scientific investigators do not support these alleged clinical observations often based on the statements of consumers.

In order to arrive at a working basis, let us analyze the materials used in making the beverages. The alleged medicinal virtues cannot be said to reside in sucrose, molasses, or the various other saccharine solutions, although some may be slightly laxative. One would hardly venture to say that certain medicinal effects are peculiarly due to the alcohol or the carbonic acid or both, present in these beverages. Alcohol is contra-indicated in certain diseases of the kidney and is not enthusiastically recognized by modern medicine as therapeutically efficacious in rheumatic conditions. The alleged virtues must therefore be inherent in the biological agents or are developed in the process of fermentation. Bebées are composed of yeast plants and bacteria. It is well known that vitamines are produced by growing yeast plants. Very little is known of the corresponding products, if any, produced by bacteria. P. Portier and his co-workers have, however, made some observations along this line. A Ranc in a résumé,[1] including Portier's work, says, in substance, the conclusion is reached that certain microörganisms are the creators of vitamines and that *bacillus subtilis* may belong to this group. In an article[2] on the "Creation of Vitamines in the Intestines of Rabbits Fed on Sterilized Food" appears the following: As the result of these tests on mammals and birds it appears that the conclusion might be reached that there is a creation of vitamines in the intestines of animals receiving a devitaminized diet, due to the intestinal bacteria. Even though it should be ultimately established that certain bacteria produce vitamines, and even differing from the yeast vitamines, the character of the "California Bees" alcoholic beverage is hardly such as would justify medicinal claims of the character considered above.

QUARTER CENTURY IN PHARMACY AS A BOARD MEMBER.*

BY GEORGE C. DIEKMAN.

The primary object of this paper is to review briefly the most important and outstanding events that were responsible for the almost revolutionary changes that took place in the practice of the profession of pharmacy, during the writer's connection with boards of pharmacy of his native city and State, a period covering over a quarter century.

No cognizance will be taken of events that transpired prior to the year 1895, as it is not the intent to present a historical review of the activities of the various boards of pharmacy which at one time or other, beginning with the year of 1871, were operative in the State of New York, but advances made in pharmacy, after and inclusive of the year 1895, at which time the writer was privileged to serve as a Board member, and in which capacity he has served continuously until this time.

The writer hopes that at some future time the history of pharmacy, as far as this relates to the State of New York, will be written and presented to the Historical Section of the American Pharmaceutical Association. There are a number

[1] *l'Ind. Chim.*, 6, 136, 1919; *C. A.*, 13, 2059, 1919.

[2] *Compt. rend.*, 170, 478, 1920; *C. A.*, 14, 1703, 1920.

* Presented to Section on Historical Pharmacy, A. PH. A., New Orleans meeting, 1921.