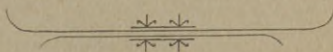


Brush (E. F.)

FERMENTED *

* * MILK.



BY

E. F. BRUSH, M.D.,

MOUNT VERNON, N. Y.



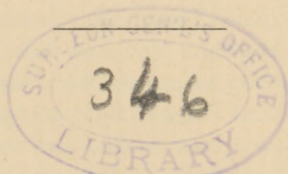
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FROM the most ancient times milk has been esteemed as of great value for human food. Among the more civilized races of mankind this article has been used fresh, and manufactured into butter and cheese, but among the uncivilized and semi-civilized races the latter preparations are little known, and the milk of their animals is principally used after it has undergone various forms of fermentation. Thus the Scythians, Tartars, the nomadic tribes of the Russian steppes and Western Siberia, transform their milk into kumyss. The Arabians use a fermented milk called *leban*, the Turks also ferment their milk and call it *yaourt*, while some of the other Oriental tribes designate their fermented milk as *keschk*, *karagart*, and *jourt*. In some parts of Asia, where the natives like to season their drink with red pepper, they relieve the burning of the mouth by drinking milk that has undergone a spontaneous lactic fermentation—that is, common, sour milk. This variety of milk is now being sold in New York as one of the fermented milk foods. The Caucasian mountaineers ferment their milk and call it *kephir*. This beverage attracted the attention of the medical men on the Continent because in some respects it resembled kumyss. Professor

Struve was, I think, the first to call attention to it, but, according to this authority, its preparation was surrounded with mystery, and the ferment used could only be obtained from the mountaineers. The ferment was called kephir grains. P. Kern seems to have been the first to procure these grains from the Caucasians, and described them in 1882 in the *Bot. Ztg.* and in the Bulletin of the Moscow Imperial Natural Society; he called these granular masses *dispora Caucasica*. Because of the mystery surrounding this ferment and the manner in which it was presented to the public, the beverage formed by its action attracted considerable attention in Russia and Germany. Such men as Hueppe, De Bary, and others took up the subject, and it became quite popular. Still, the source from which the Caucasian mountaineers obtained their ferment remained a mystery; nevertheless, like many other medical profundities, these kephir grains suddenly became an article of commerce, and the market was well supplied at a high rate. When this Continental beverage was at the height of its popularity, I procured half an ounce of the grains at a price of one dollar and a half. After extended experiments with the ferment, I reached the conclusion that it was very weak in its vinous action, as a larger amount of the milk-sugar was changed into lactic acid (and this change is what takes place spontaneously in milk when no agent is added), and the amount of alcohol obtained by the kephir was very small, being in all cases less than one per cent. It is a well-known fact that in conducting the process of alcoholic fermentation, the more we complete the vinous destruction of sugar the more completely do we guard against the other and more dangerous changes that take place in nitrogenized foods.

Now let us see what this kephir ferment is. Professor A. de Bary, of the University of Strasburg, says, "The

hay-bacillus-scum is properly zooglœa, with a special characteristic form ; formations, more or less like it, are found often enough in fluids containing decomposable organic bodies ; highly characteristic zooglœa developed in a fluid are the frog spawn, bacterium of the sugar-factories and bacterium of kephir." Thus we see that kephir is largely a zooglœa, very much like the mother of vinegar and such like diseased masses of fermentative bodies. De Bary further says, "The kephir grains are in their first living state white bodies, usually of an irregular roundish form, equal to or exceeding a walnut in size, chiefly composed of rod-shaped bacteria and numerous groups of sprouting fungi, living and growing in common with the bacteria." Crookshank, in his "Manual of Bacteriology," describes the kephir ferment as *bacillus Caucasicus*, "rods forming two spores, one at each end, otherwise similar to *bacillus subtilis* ; they occur in the form of whitish lumps, in company with *saccharomyces mycoderma*." Thus it will be seen that in these kephir grains we have a mass of micro-organisms procured from the dirty skin-sacks of an uncivilized race of dirty people. In this age of bacteriology, in which we are able to separate and cultivate any of the germs we wish to produce a desired effect, it seems strange that we should go to an uncivilized race and procure the accumulating mass of diseased germs that has been gathering for years in their dirty skin milk-sacks. And this simply because some one proclaimed the derivation of the ferment a mystery.

But the strangest part of this kephir craze in Continental Europe was the discovery, by Alexander Levy, in 1886, that effervescing alcoholic kephir can be procured without any kephir grains whatever, by simply bottling the milk and shaking it with sufficient violence while it is turning sour. This form of fermented milk gives

nearly double the percentage of alcohol that is obtained from milk to which the kephir grains had been added. Thus we see that the addition of these masses of zooglœa rather retards than accelerates the change we wish to produce. Professor De Bary, who had devoted a good deal of attention to kephir, describing the process with minuteness, after he had verified, with the assistance of Professor Schmiedeberg, the correctness of Levy's discovery, says, "Our former explanation must therefore be abandoned, and there is no other at present ready to take its place. *But the case is full of instruction for our warning.*"

Since the pricking of this Caucasian milk-bag in Continental Europe, thus destroying the market for the sale of kephir grains, the French and German kephir manufacturing companies are establishing themselves here, and using the old and exploded medical testimonies to develop the business which had exhausted itself in their own land.

Professor Taylor, of Cincinnati, in the May number of the ARCHIVES OF PEDIATRICS, makes some statements in his article on "Kephir, and its Use as an Infant Food," which I wish to question. I do not, for an instant, doubt the correctness of his observations of cases, but it is a well-known fact in all hospital experience that in the trial of all new preparations, no matter what the ultimate result may be, the patients seem to get better, and the explanation of this phenomenon, plain enough to many a hospital interne, is that while patients are under observation for the trial of new treatment, the care and attention given them is always much greater than that bestowed on patients undergoing a routine method of treatment. We can all remember articles that raised our hopes from the glowing accounts collected at the hospitals, and that were finally abandoned as useless. But the professor's

statement that "the presence of lactic acid has a germicidal action upon a large class of micro-organisms, and thus acts as a purifier of the milk," is decidedly wrong. The large class of micro-organisms which he adds in his kephir ferment certainly do not seem to be effected. Lactic acid in milk is not a purifier, it is simply a forerunner of putrefaction. In his description of the putrefactive process in "animal alkaloids," Brown says in his book, "The mass-residue exhibits a progressive *role* of fermentation; at first the *lactic*, then the butyric, and so on, giving the finishing characteristics of the putrefactive condition." This is simply what takes place in milk exposed to the air; the lactic fermentation first and then the butyric; until these have completed their *role*, bacteria termo and the other micro-organisms that appear to produce putrefactive changes cannot act. Therefore lactic acid is not a purifier, but a dangerous body in nitrogenized foods. It is simply lactic-acid fermentation that has taken place in certain articles of food, and the putrefactive germs first commencing their life that produce the violent attacks of choleraic diarrhoea that seize persons who have eaten food that has turned sour. Such a careless statement as this of Professor Taylor should not, I think, be allowed to pass unchallenged. Lactic acid in food must always be looked upon as a dangerous body; it is a far different substance when used medicinally in its free state than it is in combination with nitrogenous bodies undergoing fermentative changes that result in the dangerous alkaloids produced by putrefactive ferments.

Professor Taylor seems to know as little about kumyss as he does about kephir. One might infer from his expressions that the only genuine kumyss is that made in skin-bags of the Bashkirs in their old traditional way, and that all other kumyss, no matter how much intelli-

gence is displayed in its manufacture, is in disrepute; while, on the other hand, kephir can be made without any intelligence by any one who possesses the ferment without knowing whence the ferment is derived or what action is set up by this mass. When one prepares kumyss intelligently one knows exactly what fermentative changes are to be produced, and can, therefore, select the proper ferment for the purpose. But this, according to the professor, does not possess the virtues of a genuine article, while a mass of diseased fermentative germs with a variety of bacteria and fungi, of which no man knows which will predominate, this makes genuine kephir.



