

June butter a better flavor than winter butter. Now, the butter-maker in ripening his cream will always produce in it a certain amount of acid from the lactic organisms, and even if he has no proper flavour producing species present the butter that he obtains will be a fairly good article, provided he does not happen to have any of the undesirable species present. He knows well enough that during certain seasons in the year he can obtain a butter that has no very bad taste, and yet that does not have the desirable flavour. No method at his disposal will enable him at such times to give his butter the flavour he desires. Under such conditions his cream, is affected with the neutral class of bacteria, while mischievous ones are absent as well as the desirable flavour-producing species. By proper care in barns and dairies the undesirable species may be in general kept out of the cream. By the use of cleanly methods in the cow barn and dairy we may depend upon the milk and cream containing a small quantity of bacteria and only wholesome ones.

Conn has found that winter cream and June cream contain a distinct *bacteria flora* in the same creamery; that the species of bacteria in different creameries differ at identical dates; that the species furnished a creamery by different patrons differ, and that, in short, the bacterial flora of a creamery is undergoing constant change. It is, of course, largely a matter of luck whether the cream at a given creamery chances at a certain time to have the high flavour-producing species present.

To eliminate this factor of luck from the ripening of cream, pure cultures have been prepared in laboratories, (both in the United States and in Europe,) of the bacteria that sour and give the desired flavour and aroma to cream, and these cultures have been used in practical experiments. When inoculated into the cream they sour it rapidly and produce at the same time a desirable aroma. In other cases forms of bacteria have been selected which impart a desirable flavour and aroma without materially aiding in souring the cream. In this case the lactic organisms commonly present in the cream are relied upon for giving it the desired acidity. An organism isolated by Conn, and named by him *Bacillus No 41*, has given very promising results, and has been adopted in a number of creameries in this country for ripening the cream. In the

use of *Bacillus 41* or *B. 41* as it is commonly called, a large culture of the organism is added to the ordinary cream, and the ripening is carried, on as usual. The result has been that souring is delayed, and the ripening may be continued longer and thus the flavour be improved, and a noticeably better product is obtained. The peculiar effect of this organism appears to be to add to the butter a flavour which the butter-maker describes as a "quick grass" flavour, such as he looks for in June butter. The aroma is not greatly affected. The pleasant flavour seems to be added to the butter in all conditions in which the experiments has thus far been made. It has been tried upon poor cream and upon good cream; upon fresh cream and stale cream; upon separated cream and upon gravity cream; in creameries of the very highest character and creameries of a very much lower grade, and the verdict in all cases has been uniform. Wherever it has been added to the cream for ripening in the proper way there has been an improvement in the quality of the butter made in the individual creamery. The butter of a poor creamery has not, indeed, been brought up to the quality of gilt-edge butter, but it has been improved; and even the gilt-edged butter of our highest class creameries has been pronounced better after the use of this bacillus in the ripening of its cream. Indeed, up to the present time it has been chiefly the better creameries which have adopted its use.

There is very little doubt that the ripening of cream by pure cultures of bacteria is sure to become more popular, for they make it possible for the butter-maker to obtain uniformity all the year round.

Both the acid ferments and *B. 41* are now put up in such form that they can be readily distributed to the creameries of the country. Their use is rapidly growing, and in my opinion it will not be long before it will become almost universal. (1)

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(1) But it must not be forgotten that too pronounced a flavour is not popular in England and still less popular in Scotland, where in the best houses, most of the butter is churned daily from cream taken from the previous day's milk: Ed.