

THE PRODUCTION OF SANITARY MILK

BY

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OUTLINE.

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In order to discuss this subject it will be necessary to define a term which has but of late years come into use, and is very differently interpreted by various dairymen. The definition I have chosen may not be the one most largely accepted, but since there is but the one term for different qualities of product we must use the definition rather than the term itself as distinctive.

Sanitary milk in this article means, milk produced and handled in such a way, from the cow to the consumer, that it retains its entire high food value and is free from all the dangers which menace our ordinary milk supply. What these dangers are will appear as the different features of the production of milk are taken up.

That the production of such milk is the logical outcome of modern methods and conditions, and is a necessity in the economy of our large cities, it takes but a few words to show. We live under artificial conditions which are extremely trying to the human organism. We spend millions of dollars for hospitals, medicines, doctors and nursing bills. Good common sense demands that we furnish a pure food supply.

Milk, the universal food stuff, is more easily contaminated and rendered unwholesome, or absolutely dangerous than any other food material of common use. Except where under the supervision of the proper authorities it is more commonly adulterated than any other food. The increased demand for milk leads to the establishment of large dairies near the centers of population, and in the large dairy the chance for contamination of the product is increased. Extra precautions must then be taken to provide pure milk for general consumption.

But it is as food for infants and invalids that milk needs the most careful handling. Reports of Sanitary Boards, Boards of

Health and Medical Societies show that much sickness is caused among infants by the presence of bacteria in milk, and that specific disease germs are often carried by this medium.

That these facts are recognized is evidenced by the wide spread interest lately shown by newspapers and by ordinances passed by cities concerning inspection and regulation of milk supply.

STATE LAWS OF ILLINOIS, provide penalties for sale of adulterated milk without the knowledge of the purchaser, defining adulterated milk as milk to which water or any foreign substances has been added, and fix a standard of composition for whole milk.

Water 88%

Milk solids 12%

Butter-fat 3%

The keeping of diseased cows for milk production is prohibited.

Also feeding on foods that produce unwholesome milk.

Sale of skimmed milk is prohibited, unless, purchaser is informed of the quality of the product.

STATE LAWS OF MASSACHUSETTS, prohibit adulteration, provide penalties for infraction of laws and commissioners to inspect and see that laws are enforced.

Statistics from Chicago, St. Louis and Boston show a large decrease in the death rate among infants after the institution of inspection methods in connection with the milk supply of those cities. There was not a similar decrease in the death rate among adults.

In view of the above facts, the methods by which sanitary milk is produced are of considerable interest.

As brought out at a meeting of the Board of Alderman of Fall River, Connecticut, it is easier to name the conditions which

should exist than it is to enumerate the improper conditions which are found to exist.

Fall River is one of those cities which came to a realization of the importance of pure milk as a result of an epidemic of typhoid fever which was traced directly to one of the dairies supplying milk to the city. At this meeting the Fall River Medical Society presented the question of city supervision of milk supply and incidentally gave the following summary of the proper conditions for milk production, to wit:

Pure milk can be produced only from healthy cows, well cared for in clean stables, well lighted and attended by clean healthy men. Milk must be kept in clean utensils, in pure locations, and must not be adulterated or preserved by the use of chemicals.

Water and food supply of cows is important. Pure milk never came from an unclean milk room.

Let us examine this in detail and see what these statements mean.

Pure milk can only be produced from healthy cows. The great importance of this has been emphasized in regard to the tuberculosis, and a method discovered by which we can determine almost to a certainty the presence of this disease in cattle. True it is now claimed by the leading bacteriologist in the world, Dr. Robert Koch of Berlin, that bovine tuberculosis is not capable of transmission to man. This is however in dispute. The mass of evidence points in the other direction.

Of one thing we may be certain, if our cows do not have tuberculosis they will not transmit the germ of the disease through the milk to the consumer, and if we would be certain, the only safe way in the light of present knowledge is to apply the tuberculin test

and discard all diseased cows.

Foot and mouth disease is undoubtedly communicable to man, and cases should be isolated from the herd producing milk for direct consumption. But it is not only in the nature of the bacterial content that milk is affected by a diseased condition of the cow. So intimately is the reaction of milk allied to the nervous system of the cow that any disease or any undue excitement causes a change in the nature of the solid content of the milk, rendering it unfit for consumption by those most dependent upon its use, the invalids and infants. Inflammation of the udder, nervous excitement, due to abortion or to rough handling or irregularity in food supply, are conditions to be scrupulously avoided in the production of sanitary milk.

So detrimental is an inflamed udder that dairymen insist that for the production of sanitary milk we do not want the high yielding type of cow, since they are more subject to this trouble. These cows must be kept in suitable quarters and properly cared for if a first class product is desired.

A recent bulletin from the University of Illinois Experiment Station gives some very good advice along this line.

A good stable is not necessarily expensive, but some additional expense at the beginning will be a saving in the long run, as the greater facilities thus provided lessen the labor required in caring for cows and milk.

Cleanliness is the one great essential. Yard and stable must both be well drained, and the yard should be surfaced with some material which will prevent its getting muddy. Gravel or cinders make a good yard covering. Some shelter should be provided in the yard so that the cows may be given out-door exercise except in the most inclement weather.

The stable itself should be warm, well lighted and ventilated and easily cleaned. The requirements for a warm stable differ for different climates, but the temperature should not be below 40°F.

Light is essential to cleanliness and healthfulness. The bulletin above referred to recommends from three-fourths to one and one-half square feet of glass for every linear foot of outside wall. Another rule is two and one-half square feet for every animal. Ventilation is, if anything, more important than light. Constant renewal of the air is necessary for the health of the animals, and for the removal of odors which would contaminate the milk. .

Many systems are in use but many of them have this principle in common. The air should be admitted near the ceiling of the stable and removed near the floor. This removes the colder air instead of the warmer and prevents a draft. One ventilating flue 4 x4 feet, arranged to allow free passage of air will be sufficient for twenty cows.

Now, having the stable well drained, lighted and ventilated we must keep it clean. Floors, walls and ceiling should be smooth and tight. All may be of wood, but the best floors are of cement. These should not be too smooth as the cows will slip. Gutters should be provided of such size and distance from the manger that they will receive all the excrement. This should be removed daily and hauled away from the yard. Floor and gutter should be constructed to drain well so that they may be washed. Stalls, mangers, etc., should be as simple and plain as possible, so that dirt will not accumulate.

Walls and ceiling should be white washed. This can be done easily and cheaply if a spray pump is used for applying the white-wash, and as this is a good disinfectant it should be applied often.

Once a month is not too often.

Another essential point is the character of the food and water supply for the herd. Since we can only produce sanitary milk from healthy cows, it behoves us to give them only such food and water as <sup>is</sup> in good and healthful condition. Musty hay, soured grain or stagnant water should be avoided.

Many feeds if eaten shortly before milking will taint the milk. Green alfalfa, turnips, etc. act in this way. For this reason it is a safe rule not to allow the cow any feed for at least two hours previous to milking. Another reason for the same practice where the cows are being fed in the barn, that handling the feed fills the air with dust, and to this cling bacteria. Milk drawn into such an atmosphere is certain to contain much foreign material. Feed should be supplied regularly that the cows may not become unduly excited by getting hungry.

We are now ready to begin to get ready to milk. As above intimated no feed or bedding should be handled in the barn for some time previous to milking.

Before a cow is milked she should be clean, and the only way to have her so is to wash her. The udder and flank must not only appear clean but must be clean.

At the Illinois Experiment Station some work was done to determine the amount of dirt which would fall from the udder during milking. Four and one-half minutes was the time allowed for actual milking. A muddy udder was selected, and for four and one-half minutes the milker went through the motions of milking over a glass dish the size of a milk pail. The dirt was collected, the udder washed and the operation repeated. The same operations were gone through with on slightly soiled and on apparently clean udders with the following re-



sults: From the muddy udder ninety-four times as much dirt fell as from the washed udder. From a slightly soiled udder twenty-two times as much; while from an apparently clean udder, such as is seldom found, three and one-half times as much dirt fell as from the washed udder. When we consider what this filth consists of, and that such filth is the natural habitat of bacteria, and that it is literally swarming with them, it is unnecessary to say anything further on the advisability of washing udders.

If the cow must be clean, so also must the milker. His hands should be clean and the outer garments worn at milking time should be worn at no other time, and should be washed frequently. The use of white garments is to be recommended as they more quickly show their soiled conditions. It goes without saying that the use of tobacco should be prohibited, and a diseased milker should be rejected the same as a diseased cow. So with any person who is concerned in handling the milk.

In the case of one epidemic of fever it was found that all the families attacked were supplied from one dairy. A visit to this dairy discovered, at the time of the visit, cans of milk sitting open in the room adjoining the one where, in a bed of undescribable filth, lay a typhoid fever patient. Such conditions or any approach to them should not be allowed if we are to be sure that our product is perfectly healthful.

The first few streams of milk should be rejected, as bacteria easily work their way up into the teats and the fore-milk, as it is called, is badly infected with these enemies of pure sweet milk.

An open milk pail is an abomination in the sight of the cleanly dairyman. The sanitary milk pail consists of a pail with a cover in which is an opening some five inches in diameter and this is

closed with a strainer of absorbent cotton. As soon as milk is drawn it should be removed from the stable to prevent the absorption of odors. Many milk rooms are in close connection with the barn, but this practice is unwise. The milk should be thoroughly aerated to drive off animal odors. It is recommended by many to run the milk through a separator to remove any dirt which has accumulated. It should be noted however, that only such dirt as has not been dissolved can be removed in this manner.

After aerating and separating, the milk should be cooled and bottled. The cooling is a much important feature of the work as milk as drawn is at the ideal temperature for bacterial growth. The cooler we get the milk and the sooner after milking, the fewer bacteria will develop, and the longer the milk will keep. A low temperature should be maintained continuously until milk is consumed. Each milk bottle is closed with a pulp stopper and over this is put the seal of the producer, in order that the consumer may know the product he is getting.

If we have been cleanly with our cows and barn, we must redouble our efforts in the milk room.

In construction we should have a well drained floor, tight smooth walls and ceiling. Light and ventilation should be abundant. The furnishings should be as severely plain as possible. Probably one of the greatest sources of bacterial infection of milk is the utensils used in handling it. All seams in tin ware should be soldered smooth and all corners should be made rounding by the same means. Corners should be avoided where it is possible to use circular utensils. All utensils should be washed as soon as possible after using, first with warm water then with hot. They should then be placed in a tight chest and subjected to live steam for at least twenty minutes.

The bottles used for delivering the milk should be plain, as

lettering in the glass is hard to clean. The bottles should be subjected to the same sterilizing process as the other utensils.

Milk handled as above has been sent across the Atlantic Ocean and back without the use of any preservative except cold, and was in good condition when it came back.

Cold and cleanliness are the only preservatives allowable in the milk dairy. Cleanliness must extend not only as indicated above but the surroundings must be as cleanly as possible. The milk house should be located in the opposite direction from the barn to which the yards are. Hog pens in the near vicinity are a nuisance. The wells from which the water is drawn should be carefully guarded against contamination in any way.

"No drug preservative exists that is not injurious to the digestive system if used continuously." Breeders Gazette.

This specific statement is here made to emphasize a well known fact. They are not only injurious in the small quantities ordinarily used but in the hands of unscrupulous dairymen and milk dealers they become a positive and immediate danger. A man who will use a drug to preserve his milk was in an especially bad condition, and this process might be repeated by those through whose hands the milk passes. Since these chemicals are all more or less poisonous it is easy to see the danger.

No preservatives are used by honorable dairymen, and city milk inspectors should condemn the milk from and prosecute the owners of dairies where their use is in practice.

Adulterants as well as preservatives are injurious. One of the most common is the addition of water. Provided that the water is pure this is probably less injurious than the other practices, for in-

stance the removal of butter-fat. Any modification of milk from its natural composition should be fully understood by the consumer. This would eliminate such practices, as above indicated, for the purpose of fraud and still leaves the way open for the legitimate use of modified milk. The removal of butterfat or addition of other substances if done under a competent physician, and for a specific purpose is often beneficial, but where these things are done with fraudulent intent the results are apt to be disastrous.

It is evident that the production of sanitary milk is attended with some additional expense over ordinary milk production. This expense must and should be met by the consumers, and just to the extent that the demand is made for such milk will it be produced.

In the Eastern States the matter has been taken up rapidly by the larger cities and a high grade of "certified" milk brings from fifteen to even as high as twenty cents per quart. In the west the natural conditions are better and the need of extra precautions is less. Yet in the larger cities, Chicago, St. Louis, Omaha, Kansas City and Denver, there is a demand for sanitary milk. The greatest difficulty in the past has been to impress upon the minds of the consumers the benefits of a line of sanitary dairy products, so that they would be willing to pay the price necessary to maintain the enterprise.

As to the future of such enterprises it seems that the cost of production will be lessened by improved labor saving methods. Lowering the price would make room for an increased out-put, while increased knowledge, among consumers, of the dangers of a food supply produced amid filth and disease, and would also tend to increase the demand.

This would seem to indicate that the production of sanitary milk was a sound business proposition in locations where the present

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demand will warrent the launching of such an enterprise.