

Leaflet AD.

**The Production of Milk
Free from Disease Germs.**

New York Agricultural Experiment Station
Geneva, N. Y.

1914

Many men have felt that the ideal market milk is one from tuberculin tested cows, which contains less than a specified number of bacteria per cubic centimeter. During the past few years, these specifications have been shown insufficient to protect our milk supplies since it has been proved that severe epidemics of septic sore throat have been spread by high grade milk supplies known to contain a minimum number of bacteria.

Unfortunately, not only the limited knowledge which we have concerning the specific nature of disease germs which may be transmitted in milk but also other difficulties make it impossible to give any directions whereby the individual farmer can produce a milk known to be free from disease germs. However, certain directions may be given whereby a farmer may produce milk which will be free from disease germs under ordinary circumstances.

A complete list of all the possible ways in which disease germs get into milk cannot be given. In all ordinary cases, the ultimate source of these is either the cow, or various persons who handle the milk and dairy utensils. Of these two sources, the human source is usually thought to be the more dangerous because, as a general

rule, disease germs are more readily transmissible from person to person than they are from a cow to a person.

The disease germs which originate from the cow's body are frequently discharged into the milk through the udder but may also get into the milk with particles of feces or other discharges from the body. It is now a well established fact that disease germs may be discharged in enormous numbers from the udders of cattle suffering from udder tuberculosis, foot and mouth disease, mammitis (garget) and other less common troubles. Some, if not all, of these germs may cause disease in man when milk containing them is used. A number of these germs are not only able to live for hours in milk after it is drawn but also to increase rapidly in number so that a small quantity of milk from a diseased animal may infect a large quantity of milk. Much can be done toward preventing the entrance of these germs into milk but there is no known method by which their entrance can be invariably prevented.

The best rule to follow is to watch the health of all animals carefully and to discard all milk from animals known or suspected to be suffering from any of the above troubles. The discarded milk should never be used to feed calves or other animals without preliminary boiling. In some cases where the

milk of these diseased animals is normal in appearance, it may be safely used after boiling or proper pasteurization. A competent authority should be consulted in all doubtful cases.

There are many ways in which **The human** human disease germs may get **source of** into milk but fortunately this **disease** does not often happen. Yet **germs.** because of the fact that, when trouble does occur, the diseases so spread may cause great suffering and death, it is important to control every way by which disease germs may get into the milk. The germs do not fly about in any mysterious way. They may be and are handled with impunity in laboratories where the persons working with them understand how to care for them. They are microscopic bodies which escape from the body in a variety of ways but are usually found in feces, urine, or nasal or mouth discharges. Inasmuch as the hands are frequently soiled with these discharges it happens that disease germs may occur on them. A milker may therefore wash them into the milk during the milking process or any person whose hands directly or indirectly come into contact with the milk, may infect it. Likewise a person who coughs so that droplets of saliva fall into the milk may thereby spread disease. Dairy utensils may become indirectly contaminated from persons handling them or from flies or from being washed with contaminated water. The dangers from

persons handling the utensils are not limited to the milkers or to the dairy helpers but include the customers as well. Where milk is delivered in utensils which are later returned to the dealer and by him distributed to other families, this becomes a real source of danger.

Important human diseases transmitted by milk are tuberculosis, typhoid fever, scarlet fever, diphtheria and septic sore throat. Other diseases such as cholera may be transmitted in this way but are not common in New York State.

The best general rules to follow are: (a) Do not allow any person known to be suffering from any of the diseases mentioned above or from any contagious disease to milk or to handle the milk or utensils in any way. These statements include customers as well as dairymen and their helpers. (b) Sterilize all milk utensils with steam so far as possible or, where this is not possible, use every precaution to keep utensils clean. **Cleanliness is the best known preventive of disease.** But even extreme cleanliness may fail if there is a single faulty link in the chain. No matter how clean the farmer may be, if the man at the milk station, who is just recovering from an attack of scarlet fever, dips his finger into the milk there may be trouble. Or no matter how cleanly the milk dealer may be, if a milker who has a case of so-called walking typhoid washes

typhoid germs off his hands into the milk there may be trouble.

Pasteurization. Under ordinary circumstances, the use of the above precautions is sufficient to protect consumers of milk. This has been proved without a doubt from the fact that thousands of people have used milk produced in this way without suffering any ill effects. Yet under modern conditions, where the milk of hundreds of cows may be mixed in one vat, thus greatly increasing the chances of trouble, further precautions must be taken to protect society. There is no possible way of making inspection of milk supplies sufficiently careful to prevent the entrance of disease germs into milk under all conditions. Thus the introductory statement that there is no way by which a farmer can produce milk which he can guarantee to be free from disease germs is true. **The most satisfactory way of meeting this difficulty thus far devised is proper pasteurization of milk.** Pasteurization consists of heating the milk to a temperature sufficiently high to kill all disease germs without giving the milk a cooked taste. In practice, it has been found difficult to apply the process in such a way that it accomplishes just what is intended. If improperly done, heating the milk may increase the number of bacteria in the milk instead of killing them or the milk may be reinfected with disease germs after pasteurization. Because of the fact that this process

may fail, the obligation to produce a milk as free as possible from disease germs still rests on the farmer even where his milk is to be pasteurized. Clean milk properly pasteurized is the slogan of many health authorities.

How important are the dangers involved. There is no question but that the dangers discussed in this leaflet are real, but there is such a tendency for enthusiastic workers or for ignorant persons to magnify the dangers that a conservative statement of the facts is needed. In the agitation for freeing our meat and milk supplies from tuberculosis, it has frequently been forgotten that the most real source of danger in this case is in the transmission of the disease directly from person to person. There is a pretty general agreement at the present time that some, but not the greater part of human tuberculosis, is caused by infected milk and meat supplies. The exact percentage caused in this way is still a matter of discussion. Some typhoid is carried by milk but here again this is not as important as a source of infection as infected water supplies. Diphtheria and scarlet fever are likewise carried by infected milk but not as commonly in this way as by other means. Our knowledge of septic sore throat epidemics is still too incomplete to warrant any final statement concerning the relative importance of this danger. In several instances, very severe epidemics have been

traced to milk. But probably the most real source of danger from poor quality milk is caused by its use as a food for babies and children. The sum total of these dangers is sufficient to warrant a rigid control of this important article of food.

For these reasons the farmer
The future. may confidently expect much further agitation looking toward the adoption of laws, regulations and the like designed to prevent the entrance of disease germs into milk. Compulsory pasteurization of all milk supplies is not an improbability of the near future. In some cases legislation will undoubtedly outrun our real knowledge and will work hardship on the farmers. This should not, however, prevent farmers from being in sympathy with the general movement; for it is in the right direction.