

(1.) *Pollution at the Time of Milking.*

This may be caused by the cow, the shed, the milker, or the milk-pail.

(a.) *The Cow.*—It has already been stated that the cow may contaminate milk with certain germs, such as those of tuberculosis and suppuration. In rare instances foot-and-mouth disease has been known to cause peculiar clinical symptoms in persons who had partaken of the milk. But in this portion of the report we are more immediately concerned with pollution of milk by healthy cows. It must be patent to the most casual observer how this can be done. Witness a cow driven into its bail from a dirty stockyard, with mud and dung on its flanks, tail, and udder. Rarely are such cows properly cleaned. In some instances the udder is wiped with a dirty rag; still rarer is it to see the tail tied.

Last November I inspected a dairy that was well kept, the yard, shed, and utensils being extremely clean. The milker carefully, and possibly a little ostentatiously, washed his hands and the cow's udder, and then took hold of the dung-begrimed tail to tie it preparatory to milking. I suggested he might have tied the tail before washing his hands. He laughingly assented.

It is not to be wondered at that fifty per cent. of the specimens of milk examined by the Department contained excrementitious organisms. Dr. Backhaus estimates that no less than 300 cwt. of dung is daily consumed in Berlin in milk. Cow's hair will also convey germs to the bucket. Witness the number of hairs that can be seen at a first straining.

(b.) *The Shed and Yards.*—The latter are often indescribably dirty. It is not unusual to see cows up to their hocks in mud. Very few yards are properly paved. The air of cow-sheds is often dusty and foul, owing to bad ventilation. Dust naturally settles in the milk, especially where fodder is used in the byre. It is quite unusual to find a clean shed. The majority are very low and dark—the interior of the roof covered with cobwebs. A space can always be seen between the bails and the external wall. This space over which the cow's head hangs is too small to be cleaned. An accumulation of rubbish is always to be found here consisting partly doubtless of the dried saliva of the cow.

(c.) The milker often wears very dirty clothes. "Good enough for milking in" is a very common saying. He rarely washes his hands before starting to milk and if he does only in doubtful washing-water. Often a little of the first milk is squirted on the hands.

(d.) *The Milk-pail.*—As a rule these pails are well kept, but care is not taken to prevent dust and filth from getting into them.

(2.) *In Preparation—i.e., in Straining and Cooling.*

As a rule the strainer is cleanly kept. It is quite the exception to find a dirty one. In cooling, however, there is another tale to tell. In a great many instances no attempt is made to cool milk. To delay the development of bacteria it should be cooled below 60 Fahr. as soon as possible after milking. Sometimes the cans are placed in a running creek, at times in the creek in which the stockyard drains. At times the milk is cooled in dirty stagnant water, yellow or green with old spillings.

It is not unusual to find dirty cans, especially in the neighbourhood of Wellington where a delay of some three days to a week sometimes occurs before the cans come back to the farm. Some of the receiving firms cleanse the cans before returning them, but that is the exception. One large supplier told me that sometimes his cans had been returned from town with maggots in them. Some farmers use coolers of various descriptions. In only one instance did I find the temperature of milk below 60°, when it was 59°. The coolers are well kept as a rule. Some farmers possess but do not use them.

(3.) *In Storage (at the Farm).*

The extent to which milk is polluted in storage naturally depends on the cleanliness of the dairy and utensils. In the course of my inspections there was little to find fault with in the general state of the dairies, but some of them were ill ventilated and foul-smelling, and contained articles that have nothing to do with the business, such as old sacking, soiled linen, harness, machinery, &c. With few exceptions, the containing utensils were fairly clean. The nearness of a foul drain or privy was occasionally discovered.

(4.) *Pollution in Transit.*

The suitability of milk as a medium for bacteria has already been discussed. It can be truly said that the conditions under which milk is collected and transmitted to Wellington are favourable for the growth of such organisms. Of all the chief towns, Wellington labours under special disadvantages as regards its milk-supply. Unlike other towns in the colony, there are few farms immediately adjoining the city. Of the 4,000-odd gallons brought into the city only 750 are brought in by cart. Some 3,300 gallons are brought in by rail—in some instances from over sixty miles. Consequently some of the milk is over twenty hours old before it gets to the consumer, and bacteria have plenty of time and every opportunity to develop. To emphasize this I cannot do better than quote the following extract from a report of Professor Delapine:—

"Of specimens of mixed milk coming from a short distance and examined within ten hours of milking 75·68 per cent. were good, whereas specimens from a long distance and kept from twenty-four to sixty hours only 39 per cent. were good. When the mean temperature in the shade was 55°-60° not one of the samples from a long distance was good, whereas 88 per cent. of those from a short distance were. In both sets of specimens the higher the temperature of the air, the smaller the percentage of milk which could be pronounced good. Therefore time and temperature must be taken into account for what is produced in a few hours in summer may occur also in winter when the milk has been kept a long time."

During the past summer I specially detailed Chief Inspector Schauer and Inspector Miller to follow some of the milk in from outlying farms. Some of the Wellington milk is brought from Longburn and Opaki, about eighty and fifty miles respectively.