

MILKING MACHINES AND MILK QUALITY

BY A. G. LOCHHEAD, DOMINION BACTERIOLOGIST.

The question of the sanitary quality of milk is receiving more attention today than ever before, and the importance of clean milk not only for direct consumption, but also for the manufacture of all dairy products; butter, cheese, condensed and powdered milk, etc., is being constantly stressed on all sides.

With the advent of the milking machine it was assumed that certain sources of infection to which hand-drawn milk is subject would be eliminated and the milk would be correspondingly better in quality. Contamination from such sources as stable air, and dirt falling from the coat of the animal may indeed be avoided if the machine is handled properly in the stable, but in spite of this machine-drawn milk is in a large number of cases more highly infected than ordinary hand-drawn milk. This is due not to any fault of the machine itself, but rather to the lack of knowledge on the part of the operator of the means to be taken to keep the machine parts sterile.

Most of the trouble with milk of high bacterial content which machine users have experienced is traceable to the rubber parts, the contamination from which can be almost unbelievably high even when the tubes are apparently clean. This is because there is still a general lack of appreciation on the part of users of machines of the difference between a clean and a sterile machine. Removing visible dirt or traces of milk so that the tubes and cups "look clean" is not enough; it is necessary to destroy the bacteria which adhere to the moist inner surface of the rubber tubes and cups, and which will otherwise multiply and infect the fresh milk. It is therefore impossible to overestimate the importance of following up the preliminary washing and brushing of the machine parts with a sterilizing treatment. The washing in itself is insufficient, and the sterilizing, whether it be by heat or by chemicals, is only really effective if the preliminary washing has been thorough.

PRELIMINARY CLEANING.

The sooner the cleaning is commenced after milking the more efficient it will be. As soon as the last cow is milked, the test-cups should be placed in a pail of clear cold water, and with the vacuum on, the water should be drawn through the unit, the cups being lifted up and down to allow air as well as water to pass through. The cups and tubes should next be treated with hot water to which is added a dairy cleansing powder. This can be done with the suction on as before, by removing from the machine and cleaning in a sink or suitable basin, using brushes to clean out the passages. Clean hot water should be used as a final rinsing to wash out all traces of the cleansing solution and thoroughly flush the whole system. Where there is danger of water getting into the air passages a wooden plug should be put in the open end after removal from the machine.

Once a week the test-cups and tubes should be taken completely apart and thoroughly brushed, using a cleaning powder in hot water, and then reassembled when dry.

STERILIZATION.

After the tubes and test-cups have been cleaned as indicated they should be sterilized by either the chemical or the heat treatment. Each method has some advantages and disadvantages, but if properly carried out should insure milk of excellent sanitary quality.

(a) Chemical Treatment. This involves the use of a hypochlorite solution which can be easily prepared using chloride of lime. A stock solution is first prepared using 1 pound chloride of lime to 1 gallon water, mixing the powder to a paste with a little water, then adding the full amount. This should be kept covered in a cool place, and only the clear, greenish liquid appearing above the white deposit used for making up the disinfecting solution. For use add 1 large cupful per pail of clean water, making sufficient solution in a large crock to hold the test-cups and tubes completely immersed. This solution is more efficient if a strong brine (1 to 2 pounds salt per gallon water) is used in place of the clear water in preparing the crock solution. Brine has the disadvantage of causing corrosion of certain metals, such as aluminum, but some makes of machines are now furnished with non-corroding material for parts exposed to the disinfectant.

The tubes and cups should be kept in the solution when not in use, care being taken in immersing them so that the solution can come in contact with the whole of the rubber. Keep the crock covered. The strength of the solution constantly diminishes, especially in hot weather, therefore, it is necessary to keep the sterilizing solution up to strength by the periodic addition of fresh stock solution. When no brine is used add half a cupful of stock solution for every pail of water, three times a week in summer and once or twice a week in winter. When brine is used, less stock solution is necessary. The crock solution should be renewed once a week in summer and at least every 3 weeks in winter. Before milking, the tubes should be rinsed in clean water to remove the disinfectant.

(b) Heat treatment. Heat is one of the best means at our disposal for

destroying bacteria and methods of treating tubes and test-cups, using this agency, have been most successful in helping to keep the germ content of machine drawn milk at a low figure.

The method consists simply in placing the tubes in clean, hot water and allowing them to remain in the vessel, covered, until next milking. There are modifications of the method depending upon the means of heating at the dairyman's disposal.

If steam is available the water is heated to 160-170 deg. F.; in a suitable vessel (wash boiler, etc.), and the tubes and cups submerged. The temperature is maintained for 15-20 minutes using a thermometer and then with the cover on, the contents are allowed to cool, leaving until next milking.

If no means of maintaining a steady temperature are at hand, the water may be heated on a stove to nearly boiling, the vessel removed, the tubes and cups immersed and the whole allowed to stand.

OBSERVATION.

With the heat method, there is some danger that the rubber parts may be injured, and lose elasticity. The rubber used with some of the modern machines, however, is greatly improved, being able to withstand heat with comparatively little injury, in fact, some makers advocate treatment with live steam. Where this is possible, the sanitary results are undoubtedly excellent, but the feasibility of employing this will be dependent upon the quality of rubber of the machine in question.

With the chemical method there is the danger of being over confident as to its disinfecting power, and allowing the solution to lose strength to such an extent that it is no longer capable of destroying bacteria. A solution not kept up to strength can in time be an actual source of contamination, and in warm weather especially, it is essential to keep it up to strength by repeated additions of the stock solution.

The pails, naturally should be carefully cleaned and finally treated with steam or scalding water, while the machine tops and check valves should be kept in proper shape.

In brief, the principle underlying the cleaning of a milking machine involves care 365 days a year, and a recognition of the fact that to produce good milk it must not only look clean but be sterilized to destroy germs able to multiply unseen.

Delicious Cakes Made With Sour Milk.

OATMEAL CAKES.

Cream a cupful of white sugar with 1/2 cupful of butter to which 7 tablespoonfuls of sour milk have been added. Sift together 2 cupfuls of flour, 1 teaspoonful of salt. Stir the flour mixture into the liquid, alternating with 1 cupful of rolled oats and grated coconut. When all are well blended, add 1 cupful of chopped raisins and, if liked, 1/2 of a cupful of nut-meats broken into pieces the size of a pea. Drop from a teaspoon on buttered tins and bake in a quick oven.

OATMEAL FRUIT COOKIES.

Sift together 1 cupful flour—barley flour is best—1/4 teaspoonful each of soda, nutmeg and cloves, 1/2 teaspoonful each of salt and cinnamon, and 2 tablespoonfuls sugar. Mix in 1/2 cupful raisins, then combine with 1 cupful rolled oats. Mix together an egg well beaten and 1/4 cupful each of corn syrup, sour milk and melted fat. Beat the liquid into the dry mixture and drop in teaspoonfuls on a greased baking sheet, allowing plenty of room for the cookies to spread. Bake in a quick oven.

CHOCOLATE FUDGE CAKE.

Cream together 1 1/4 cupfuls of sugar and 1/4 cupful of butter, then beat in 1 egg until the mixture is smooth and add 2 squares of chocolate melted over hot water. Sift together three times 1/4 cupfuls of flour, 1/4 teaspoonful of salt, and 1 teaspoonful each of soda and baking powder. Add 5 tablespoonfuls of boiling water. Stir some of the liquid into the batter mixture, then alternate the rest with the flour until both are used. Bake in two layers in a moderate oven for about 15 minutes—until the cake shrinks from the pan and is firm in the centre. Put together with plain white frosting, or a chocolate or fudge icing, this is delicious.



Hubby—"Oh, wife! I've been promoted to boss in the office."
Wife—"Yes. In the office maybe."

Weeds a National Problem.

Travelling through Canada in mid-summer one is struck by the prevalence and diversity of weeds. Whole districts, certainly fields, can be described as white, blue, yellow or green, the green too often, unfortunately, of couch grass rather than of clean, vigorously growing crops. The occurrence, here and there, of exceptions to the rule, simply demonstrates the possibility of better things.

Losses to farmers and to Canada, totalling many millions of dollars annually, are represented by this riot of color. Any means, however partial, of reducing such waste, must therefore command respect.

Much of eastern Canada is fit only for a forest crop. Fire and axe have exposed to the incursion of weeds, millions of acres that can only be a menace to adjoining lands until restored, by governmental or municipal action largely, to its own proper use.

In large additional areas the farming can only be described as very low—pressure cropping indeed. The land lies in hay or pasture chiefly, and in a year or two from the plow, produces herbage unmarketable as hay. Until brought under a more intensive agriculture, or correct permanent pasture management, returns from such farms will be meagre.

In more advanced farming districts there is a noticeable decrease of such conspicuous, but readily (under cultivation) suppressed weeds as buttercup, ox-eye daisy, and the hawkweed. In their place, according to healthy, appear various mustards, thistles and others. Certain weeds are more or less indicative of over-reliance on grain crops, others prevail in clover-seed growing districts, fruit or trucking lands, etc. Perennial sow thistle invades the richer soils, especially if poorly drained; Russian thistle the lighter regions; sheep sorrel those in need of liming. Everywhere some weed is ready to seize an opportunity. Man's only hope now, of comparative freedom

Who has offered a prize of \$5,000 to any British-born subject, man or woman, who succeeds in beating the record of Gertrude Ederle in swimming the English channel.

dom from weeds is to occupy every inch with adapted crops, well planted and carefully husbanded according to sound principles of tillage and plant growth. Only so can he possibly forestall Nature's constant effort to replace lost vegetation—of forest, east and west, and prairie in the interior of Canada.

To make an egg a day, weighing 1.8 ounces, it is necessary for a hen (weighing found pounds or under) to consume .48 ounce of protein, 2 ounce pure fat, and 2.3 ounces of carbohydrates, or their equivalent in fat. In extremely cold weather more carbohydrates and fat are required.

A VERY QUEER FIREMAN

BY DAVID KER.

There are few playgrounds as good as an old English or Irish manor-house. So many winding stairs, so many out-of-the-way old rooms, so many secret doors and heavy curtains and hidden passages! The whole place seems made on purpose for hide-and-seek—rather too much so, indeed, at times.

I remember once hiding in one of these old houses, and when I wanted to come out again, no way could I find—nothing but galleries and staircases and dusty old chambers and moth-eaten hangings, which seemed to go on forever, till I got quite bewildered. And at last, just as I thought I was getting back to the inhabited part of the house, out I came upon the roof!

This was the kind of house in which little Johnny Fitzgerald had to live; but he thought it the finest fun in the world. He was never tired scrambling about the carved balconies and ivy-wreathed battlements, making voyages of discovery among the tall oaken presses and huge, hearse-like beds of the upper rooms, and wandering over the flat roof with a wooden sword in his hand, pretending to be Robinson Crusoe watching for the coming of the savages, or Saint George going out to fight the dragon.

In fact, he would have been perfectly happy if he could only have had a few other boys to play with him but his father, Sir James Fitzgerald, had no more children of his own, and their nearest neighbors lived too far away to come often.

But Johnny had one playmate of his own, who was always at hand, and always ready for a game with him. A very queer playmate he was, too, as you would have said if you had seen him. His only clothing was a scarlet frock, so stained and ragged that it might have served for a scarecrow.

He was hardly taller than a well-grown boy, and almost as broad as he was long, while his huge, flat head and shaggy black hair gave him quite a hobgoblin look. His arms were much longer than his legs, and the legs themselves ended in hands instead of feet. In a word, Johnny's play-fellow was nothing else than a big, black, African monkey!

However, Coco (so the monkey was called), having been brought to England while still quite a baby, had long since got rid of his family habits of breaking everything and biting everybody. Indeed, he was quite a civilized monkey by this time, and very proud of his red frock, although he made a sad mess of it by rolling about on the grass and running about among the bushes.

It was rare fun for little Johnny to watch his nimble companion running up the ivied walls of the old house like a lamp-lighter, or swinging himself from bough to bough of the large elms in the park, to the great annoyance of the sober old folks, who could not think what strange, ill-behaved bird he was among them.

Many a funny story did Johnny have on his friend's broad shoulders, around the green lawn, or up and down the smooth gravel walk of the garden. And very often, when Sir James Fitzgerald came to see what his little son was about, he would find him and Coco fast asleep in a corner after a grand romp—the monkey's big arm around the child's neck, and the little curly head pillowed on the beast's black, hairy chest.

Now, all this was very good sport in its way; but sometimes the two used to climb into such dangerous places that Lady Fitzgerald began to get frightened. And at last, when Coco amused himself one day by carrying Johnny up to the top of the highest tree in the park, and perching him on a bough eighty feet from the ground, to the little fellow's immense delight, she grew quite angry and said that she could not have her only son's life risked like that, and that the mischievous monkey should be killed.

But Johnny set up such a howl at the idea of losing his playmate that his mother's heart melted, and she contented herself with chaining up Coco in the yard—where, fond as he was of running about, was almost as great a punishment to him, as if he had been killed outright.

For the next few days after this, Johnny was as dull as a wet day in November. His only pleasure seemed to be going every morning to visit his imprisoned play-fellow, and carry him biscuits and lumps of sugar; while poor Coco, on his part, would make a dismal grinning and chattering at the sight of him, as much as to say, "Do get me out of this scrape somehow." So things went for about a week, when an event occurred which gave everybody something else to think about.

In the dead of night, the whole house was startled by the clang of the great alarm-bell in the highest turret, while a fierce red glare shone through the windows of the west wing.

Then came shouts of "Fire! fire!" tramping of feet, ringing of bells, banging of doors, cries, screams, the crash of falling timbers and rolling stones, mingled with the long rumbling roar of the flames as they rose higher and higher, lighting up the whole country for miles round, and making every tree of the park stand out as clearly as in a photograph.

Suddenly a stream of fire shot up in the sky, broader and brighter than any that had gone before it, and down came the whole side of the house, in one great crash, just as Sir James Fitzgerald sprang out of it, into the garden, dragging one of his servants along with him.

But, all this while, where was little Johnny? His name was shouted again and again, but there was no answer. Sir James declared that he had found the boy's room empty when he rushed into it, and thought that one of the servants must have carried him away.

But none of them knew anything about him, and poor Lady Fitzgerald was beginning to cry bitterly, when, all at once, they heard a queer chattering in the tree overhead—poor fellow—and with his thick, black hair almost singed off his head, but with Johnny, unhurt, in his arms.

When the fire broke out, he had managed to get loose from his chains, which had been carelessly fastened, and flying to his little master's room, had carried him off in safety.

After that, as you may be sure, Coco had it all his own way in the castle as long as he lived.

And, years later, when little Johnny had become Sir John Fitzgerald, he used to show his guests a stuffed monkey, in the corner of his dining-hall, and tell them how well poor Coco had once played the fireman.

MY STORAGE SPACES

BY NELL R. NICHOLS.

There is scarcely one of us but who could use more storage space if we had it. About the only exception I know of for home-makers who have crowded cupboards and refrigerators is that there is a smaller surface to be kept clean than there would be with more room. This philosophy is not satisfactory in all ways. At least it did not help me half as much as did a checking-up of my storage facilities in an effort to improve them and to discover an easier way of keeping them clean.

I succeeded, not by any sleight-of-hand performance, but by planning more carefully. In most cupboards and fruit closets the shelves are not so close together as they might be. The same is true of pantries. There is nothing gained by having this distance much greater than the height of the jars and utensils to be placed on the shelves.

After thinking about this, I found a way to make some of this waste space useful. I coaxed my "handy man" to place a few narrow ledges, about six inches wide, under some of the wide shelves. These hold spices, cups, small pitchers, jelly and jam glasses, and more small articles than I knew a household contained. This greatly relieved the cupboard and pantry congestion.

Then there is the matter of the dishes used for holding the stored foods. I confess that I had not given the matter much thought. I had been using flaring-sided bowls as frequently as the straight-sided utensils are used. This one little discovery makes my refrigerator more valuable.

Caring for the refrigerator in the summer is not difficult, but I have found that the amount of ice used and the method of cleaning the little cold-storage plant greatly influence its efficiency.

Foods spoil when bacteria develop in them, and these minute organisms grow rapidly in a moist, warm, and dark place. The refrigerator is quite dark; sometimes it is moist, and if it is not kept well filled with ice it is not as cool as it should be.

A well-filled ice chamber not only keeps the food better but is also economical of ice. If the supply is allowed to get low, the refrigerator becomes warmer than it should be, and when new ice is added it melts very quickly. I used to think that wrapping the

ice in paper or a blanket made it last longer. This was very true, but it also kept the refrigerator from being as cool as is desirable. It was not an economy in the end.

The principle of the refrigerator is this: Cold air is heavier than warm air. Therefore the air next to the ice becomes so heavy that it falls down into the refrigerator around the food, crowding out the warm air, which rises and passes into the ice compartment. It is this continual circulation of air that keeps the food in the refrigerator cool. If the ice is wrapped, the warm air cannot get to it easily to be chilled. The insulation of the walls prevents the ice from melting any more rapidly than is essential.

The coldest part of any refrigerator is the bottom shelf; the warmest place, the top one. Storing food directly on the ice is not satisfactory, I find, because it is not as cold there as on the bottom shelf, and the odors of the food are carried by the warm air into the ice chamber to pass out through the drain pipe. If there are foods there, they absorb some of the undesirable odors. When my refrigerator is crowded so that I find it necessary to use the ice compartment to hold a few articles, I place them in tightly stoppered bottles or covered utensils.

I keep the meats, milk, butter, and cream on the lowest shelf because they are best if stored at a low temperature. The top shelf is reserved for cheese, bananas, and other foods with strong odors, so these will pass out without being absorbed by everything on the shelves.

By using care in cleaning my refrigerator, I am able to keep it dry. I wipe up any milk, water or food spilled in it as soon as it is noticed, no matter if it is only a drop or two. This makes for dryness and cleanliness.

An occasional washing is necessary. I use cool water in which a little baking soda is dissolved. As soon as a shelf or wall is washed, I wipe it dry with a soft cloth. The use of hot water causes the steam to condense on the walls. This makes a moist condition throughout the refrigerator.

I have covered the cupboard, fruit closet, and pantry shelves either with oilcloth or a couple of coats of gray paint. Both of these surfaces repel dirt rather than absorb it, and they may be cleaned quickly.

S.S. LESSON

September 12.—Gifts for the Tabernacle, Exodus 35: 4 to 36: 7. Golden Text—Honor the Lord with thy substance, and with the first-fruits of all thine increase.—Prov. 3: 9.

ANALYSIS.

I. THE INVITATION TO GIVE, 35: 4-9.
II. THE CALL FOR SKILLED WORKMEN, 35: 10-19.
III. THE BRINGING OF THE GIFTS, 35: 20-29; 36: 5-7.

IV. THE CALL OF WISE AND CAPABLE LEADERS, 35: 30 to 36: 4.
INTRODUCTION.—Chapters 35 to 40 are closely parallel to chapters 25 to 31. They tell how the instructions given in detail were carried out in detail. There are minor differences, but the substance is the same in both. These chapters abound in such descriptive details as the priests loved, and it is not without reason that they are believed to be drawn from a history written and preserved by the priests of a later age.

I. THE INVITATION TO GIVE, 35: 4-9.

Whoever is of a willing heart. This is the Lord's command, but the gifts are to be offered freely. The unwilling are not asked to give. (Compare ch. 25: 2-7.) The gold was "for those vessels and parts of the sanctuary which were nearest to Jehovah, the silver and the copper (brass) for those which were farther off and less important." The colors named were obtained, the purple in various tones, from violet to purple-red, from a shell-fish found on rocks in the Mediterranean Sea, and the scarlet from the cochineal insect, which is shaped and colored like a berry and is found on the leaves and twigs of a Syrian tree, the holm-oak. The badgers' skins, are called in the Revised Version "sealskins." They were, probably, skins of the dugong, or sea-cow, an animal in general appearance not unlike a dolphin, common in the Red Sea.

Another view is that the word used here is simply the Egyptian word for leather. The acacia, or shittim wood, is common in the peninsula of Sinai. "It is," Driver says, "a gnarled and thorny tree, some fifteen to twenty-five feet in height, and its wood is hard, close-grained, and durable." The oil for the light is described in ch. 27: 29 as "pure oil beaten for the light." This oil was obtained "by gently pounding the olives in a mortar," and afterward straining the pulp through a wicker basket. The spices for anointing oil are named in ch. 30: 22-25 and their use is described in the verses following. The ophod was, probably, as described by Driver, "a kind of waistcoat, consisting of an oblong piece of richly variegated material, bound round the body under the arms, and reaching down as far, apparently, as the waist." It was worn by the priest "over a long blue robe" (see ch. 28: 31-35). The word breast-plate should rather be rendered "pouch." It was a pouch or small bag worn by the priest and containing the sacred lots, the Urim and Thummim, used in certain cases for ascertaining the divine will (ch. 28: 30).

II. THE CALL FOR SKILLED WORKMEN, 35: 10-19.

Every wise hearted among you.

There is an invitation to give skilled labor for the making of the tent, its ornaments, and its furnishings, and the garments of the priests. Such a gift is not less precious in the sight of God than the gift of material things be they ever so valuable. (Compare ch. 31: 1-11.)

III. THE BRINGING OF THE GIFTS, 35: 20-29; 36: 5-7.

They came, every one whose heart stirred him up. They came of all classes, rich and poor, high and low, giving freely and gladly of what they had, both of their treasured possessions and of their labor, as many as were willing hearted. It is "an ideal picture of a community ready and eager to contribute liberally to the sanctuary and service of its God." The Revised Version renders in verse 22, "brooches, and earrings, and signet-rings, and armlets, all jewels of gold." The words "wise hearted" and "wisdom" are used here of technical skill, of handicraft, and this is declared in the passages that follow to be the gift of the spirit of God.

The people brought enough and more than enough for the service of the work. They had to be restrained from bringing.

IV. THE CALL OF WISE AND CAPABLE LEADERS, 35: 30 to 36: 4.

The Lord hath called by name. The religion of the Old Testament recognized the call of God to the skilled workman as well as to the prophet, to the craftsman as well as to the king. Ought we not to do the same to-day? The gifts of the Spirit of God are many and widely different. They are bestowed upon the leader of a migrating tribe, upon the shrewd and far-seeing statesman, upon the judge, the lawyer, the soldier, the farmer, the teacher, the poet, and the seer. Here God's spirit endows the workman with wisdom in all manner of workmanship.

Moffatt translates v. 35, "Ability to train others, endowing them with skill in every skillful craft, in engraving, in decorating, in handling violet, purple, and scarlet yarns in working with fine linen, in weaving, and in all sorts of trades and arts."

Our skill of hand, and strength of limb, Are not our own but Thine; We link them to the work of Him Who made all life divine.

With willing people and wise leaders, the sanctuary is built, strong, enduring, and beautiful. It is not surprising, therefore, to read that when the work was finished the glory of the Lord filled this tent-temple of the wilderness, ch. 40: 34-38.

A Song of Degrees.

At twelve he sang of God above; At seventeen of death and love; At twenty-two of seagulls' wings; But now he rhymes of little things.

—Frederick Kemp.

It would be better if more brooms were worn out in the poultry house.

"Why won't you go to the corn field this morning, Bobbie?" "I wouldn't go out there for anything. Didn't Uncle Tom say at breakfast that the corn had begun to shoot?"