

The Milk of Cows.

For the FARMER'S ADVOCATE, by Jas. W. Robertson, Dairy Commissioner.

The milk of cows, as the dairyman needs to know it, is composed of substances partly in solution and partly in suspension. It may be described as a thin emulsion of fat in a serum or watery solution of albuminous matter, sugar, and mineral matters. When obtained from a healthy cow in its normal state, it has a constant tendency towards acidity. It will change the color of litmus paper before lactic acid has commenced to develop. A small quantity of carbonic acid is generated soon after it is drawn if left warm, but that can be taken out of agitation and aeration. The true sourness of milk is caused by the development of lactic acid. The specific gravity of milk varies between 1029 and 1035 at 60° Fahr., that is to say, a quantity of milk equal in bulk to as much water as will weigh 1000 pounds at 60° Fahr. will weigh from 1029 to 1035 pounds at the same temperature. The effect of each per cent. of fat is to decrease the specific gravity, because the fat of milk is lighter than its other parts. The effect of each per cent. of solids other than fat is to increase the specific gravity by .00375 variation in quality. The total solids of ordinary milk vary between 12 and 16 per cent. In some unusual instances the range of variation has been known to be between 11 per cent. and 20 per cent. of total solids, and between 2 per cent. and 10 per cent. of fat. The solids of milk are its only constituents that have any real or rateable value. The water that is put into the milk by the cow, while the process of elaboration is proceeding in her udder, is worth no more per pound or per gallon than the water that may be put in by a man when it has come into his hands for use or sale. The limits of variation of the solids, other than fat, are usually within one-half of one per cent. in the same cow at different periods in her milking season. Different cows of the same breed rarely show a variation of more than one per cent. in the solids, other than fat, contained in their milk; the greatest difference exists between cows of different breeds; it will sometimes reach as much as two and a-half per cent., as between the milk of cows giving extra rich milk and those yielding a very poor quality. The solids, other than fat, or the solids in the serum of the milk also increase slightly during the milking season. The rate, is about .04 per cent. of solids not fat per month.

COMPOSITION OF MILK.

The average composition of milk from cows may be stated as:—

	COLOSTRUM per cent.	NORMAL MILK per cent.
Water.....	75.8	87
Fat.....	2.6	3.75
Casein.....	15	3.80
Albumen.....	3.6	4
Sugar.....	3	5.70
Ash.....		

The strippings of milk designate the last portion drawn from the udder of the cow at each milking, and they are richer in fat than the milk first obtained. The first milk may contain less than one per cent. of butter fat, while the last milk usually yields more than ten per cent. CREAM.

Cream has no definite or unvarying composition. It is a word used to define that part of milk into which a large per cent. of its fat has been gathered by setting or by centrifugal force. It is composed of the same constituents as milk, but they are not in the same or in any constant

relative proportion. Frequently the cream of hotels is of a beautiful blue color, but that liquid does not belong to the products of the dairyman. The results of a great many analyses show that the cream of commerce may contain anywhere from 8 to 70 per cent. of fat. All the fat of milk is held in suspension in its liquid or serum part in the form of tiny globules which have no coverings of an organic nature, but are present in the form of an emulsion. The different constituents of milk have different values, according to the ultimate purpose for which they are to be used. The fat is mainly valuable for giving cream its quality, butter its main substance, and richness to the body of cheese.

QUALITY OF DIFFERENT ELEMENTS.

The casein is the portion which is coagulated by the action of rennet in the process of cheesemaking. Albumen may be seen as a thin white scum on milk that has been scalded or boiled; it is similar in composition to the white of eggs. Sugar is one of the heat producing and fattening constituents of milk. Lactic acid has no feeding value, but being anti-febrile in its action with properties that slightly aid indigestion, a small quantity of it is not unwholesome in milk for drinking or for feeding in the stables. The ash of milk furnishes the mineral matter taken into the structure of bones and flesh by the animals which consume it. Where the milk is consumed in its liquid form or reduced in bulk to any of its products, such as butter, cheese, veal, or pork, the constituents which are valuable, and aid in any of the life-sustaining products obtained from the cow, are its solids only.

USE OF WATER.

Water is always nature's vehicle for moving things about in the animal and vegetable worlds for the support of different forms of life. The vehicle in itself is for carrying the constituents which the eater seeks to appropriate. The ever changing demands and preferences of markets make it impracticable to attach a definite value per pound to the several constituents of milk. The work of a skilful manipulator may give to anyone of them an increased value. Milk sugar in the raw state in the milk has very little value indeed, as it can be replaced for the feeding of calves by substances that are plentiful and cheap, but in its refined state fit for druggists' use, it is worth perhaps 75 cents per pound.

VALUE OF PARTS.

Judging of milk from a purely dairy standpoint I would estimate that under the present conditions if the butter fat of milk is worth 16 cents per pound in its unprepared or unmanufactured condition, the total solids, other than fat, in the milk will be equally valued at 2½ cents per pound.

TESTING MILK.

For the guidance of cheesemakers and others who desire to make quick and reliable tests of the quality of milk let me suggest the following:—

1. Examine its appearance, color, taste, smell.
2. Examine by the pioscope.
3. Test it by the lactometer.
4. Examine it by the lactoscope.
5. Examine it by the cream gauge.

6. Rule by Mr. E. W. Martin for the use of lactometre and lactoscope to determine the solids in milk: Multiply the per cent. of fat found by the lactoscope test by 0.001 and subtract the result from 1.0000; call this number "A"; find the real specific gravity from the table of lactometer degrees; subtract "A" from this

and divide the result by 0.00375, the quotient will equal the solids not fat.

7. In examining as to its sweetness for cheddar cheesemaking, scald or boil a sample; if it coagulates it is unfit for use.

8. A test for ripeness may be made by adding a few drops of extract of rennet to a given number of ounces of milk.

Garden and Orchard.**Picking and Keeping Fruits for Family Use.**

BY W. W. HILBORN, LEAMINGTON, ONT.

This article is intended more especially for farmers and others who grow their own fruit and wish to lengthen the period as much as possible through which fruit may be kept in a fresh state for family use.

Apples, first in importance, may be kept in good condition until midsummer, or until the new fruit is ready for use. It is a common practice among farmers to sell all their apples that the packers can be prevailed upon to put up for shipment and keep the culls for their own use. Such fruit is usually either small, imperfect specimens, or injured by the Codling Moth, and will not keep well; hence, long before the new crop comes in apples have altogether disappeared from their tables. Does it not appear like mistaken economy to dispose of all the first-class fruit? A few bushels of first-class N. Spys, Kings, Greenings, Baldwins, Russets, etc., should be carefully gathered as soon as ripe and packed away for use in late winter and spring. So much benefit and pleasure can thus be derived that it should be the rule, and not the exception, as at present.

Apples to keep well and be of the best flavor must be picked as soon as ripe (this may be known by the stem parting readily from the tree) and kept in a cool, damp place. If a good cellar is available they may be taken directly to it. Shelves may be made any convenient length and width, with sides five or six inches wide. These shelves may be placed one above another with just sufficient room between to handle the fruit, say ten inches. Fruit kept in this way may be looked over often with little difficulty and any decaying apples taken out. Nearly all varieties keep splendidly on shelves. The Russet family, however, does not; they shrivel badly and should be kept in tight boxes or barrels. Another good method of storage is to make boxes about ten inches deep, sixteen inches wide and two feet long. These will hold about one and a-half bushels. Place the fruit intended to be kept longest in the bottom boxes. When one box is filled place another on top, which answers in place of a cover, and continue until the required number are filled. This method has some advantages over the shelves, as the fruit in one box must be used before another is accessible, while with shelves it too often happens that the finest samples disappear too rapidly, leaving the sample inferior late in the season. This is especially true where a family of children have daily access to them.

The conditions required to keep apples perfectly is a cool, damp atmosphere, with the temperature just above freezing and as uniform as possible, and good ventilation. Where a cellar is not obtainable the old fashioned method of burying in the ground may be adopted. It is