DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

BULLETINS 1 - 20

1905-1907

DAIRY AND COLD STORAGE
COMMISSIONER'S SERIES

These results were obtained from a series of 10 churnings. They show that saltless butter, under similar conditions of manufacture, contains slightly more water than salted butter.

Regarding the relative yields of salt and saltless butter from a given weight of cream, the following data obtained from the above 10 churnings will be of interest. A total weight of cream (representing 5 churnings) of 719 pounds yielded of salted butter 208 pounds 7 ounces, while a similar weight of the same cream furnished 199 pounds 13 ounces of saltless butter. In other words, the yield of finished salted butter from cream was 28·9 per cent, while that of the finished saltless butter was 27·7 per cent.

Table IX.—Slightly Working before Salting—Salting without Previous Working.

When Worked.	Slightly worked before Salting.	Salted and then Worked.
	Water. %	Water. %
At once	14·02	14·10
After 2 hours	13·66	13·54
After 4 hours	12·55	11·91

A slight working before salting does not appear to materially affect the percentage of water.

In bringing together the results of this investigation the writer has consulted the Dairy Commissioner, Mr. J. A. Ruddick, who by his experience and larger knowledge of the butter industry has materially assisted in the consideration of the data and in the deductions therefrom that are here presented.

DEPARTMENT OF AGRICULTURE
DAIRY COMMISSIONER'S BRANCH
OTTAWA, CANADA

INSTRUCTIONS FOR TESTING INDIVIDUAL COWS

WITH SOME NOTES ON

THE USE OF THE BABCOCK MILK TESTER

BULLETIN No. 9.

Published by direction of the Hon. SYDNEY A. FISHER, Minister of Agriculture, Ottawa, Ont.

FEBRUARY, 1906.

DEPARTMENT OF AGRICULTURE
DAIRY COMMISSIONER'S BRANCH
OTTAWA, CANADA

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* The Dairy Commissioner gives his personal attention to the Dairy and Cold Storage Divisions.

† Cargo Inspectors are stationed at Liverpool, Manchester, Bristol, London and Glasgow.

LETTER OF TRANSMITTAL.

To the Honourable

The Minister of Agriculture.

Sir,—I herewith submit for your approval Bulletin No. 9 of the Dairy Commissioner's Branch Series, which consists of 'Instructions for Testing Individual Cows; with Some Notes on the Use of the Babcock Milk Tester.' The growing interest in this important question has created a demand for information of the kind contained in the bulletin; therefore, I beg to recommend that it be printed for distribution.

I have the honour to be, sir,

Your obedient servant,

J. A. RUDDICK,
Dairy Commissioner.

Ottawa, February 10, 1906.

DEPARTMENT OF AGRICULTURE
DAIRY COMMISSIONER'S BRANCH
OTTAWA, CANADA

INSTRUCTIONS FOR TESTING INDIVIDUAL COWS, WITH SOME NOTES ON THE USE OF THE BABCOCK MILK TESTER.

INTRODUCTORY.

This bulletin is issued to meet the growing demand for information concerning the manner of conducting individual tests of dairy cows.

Cow-testing associations are being organized, and it is hoped that many cows will be tested at the cheese factories and creameries, but it is quite practicable for any farmer to do the work himself if he cannot have it done in any other way.

To weigh and sample the milk for testing, the following outfit is required:—

	Probable Cost.
*A straight spring scale (fig. 1), capacity 40 pounds.	$1.25
A sample bottle for each cow (fig. 3)	5 to 10c. each
A sample dipper (fig. 4)	10c. each
A box for holding samples (fig. 5)	75c. each
1 package of 500 preservative tablets	75c.

* A circular spring scale (fig. 2), costing about $3, is more convenient.

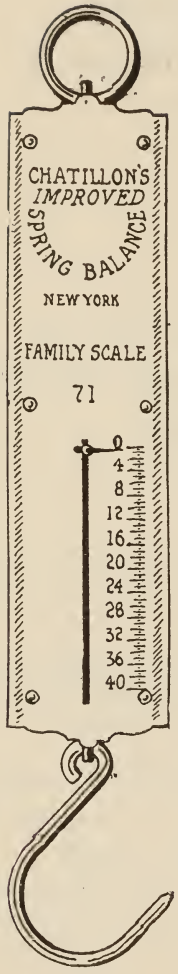

FIG. 1.

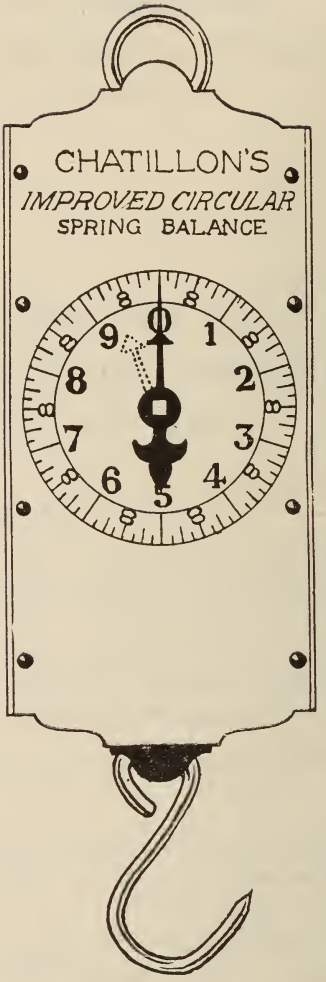

*FIG. 2.

*These scales, to weigh 30 or 60 pounds, are made with a loose pointer which by means of a thumb screw on the centre may be set anywhere on the dial, thus taking the tare of a milk pail.

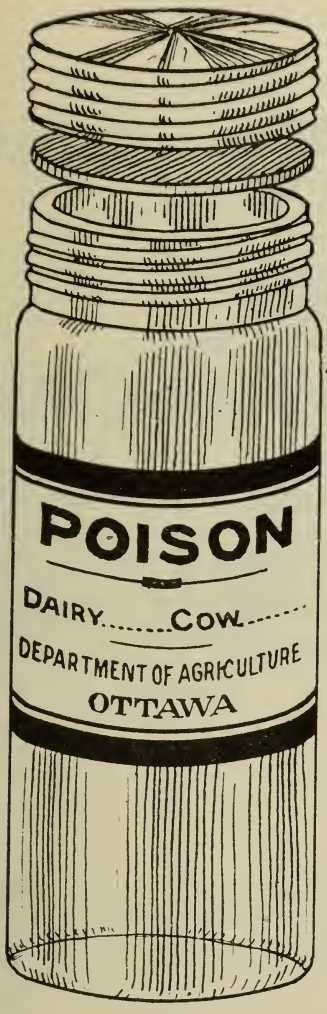

Fig. 3.

This bottle has a screw metal cap and a rubber washer.

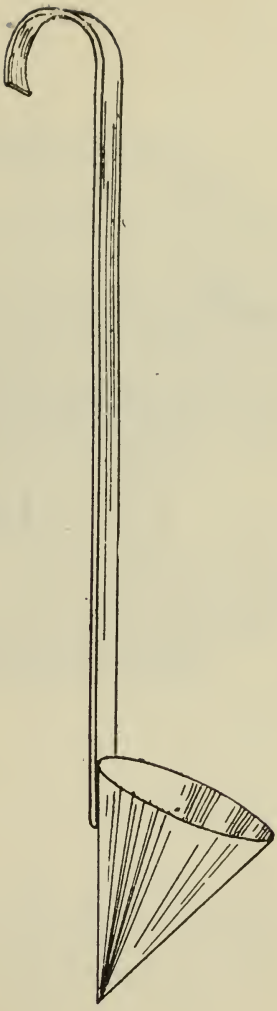

Fig. 4.

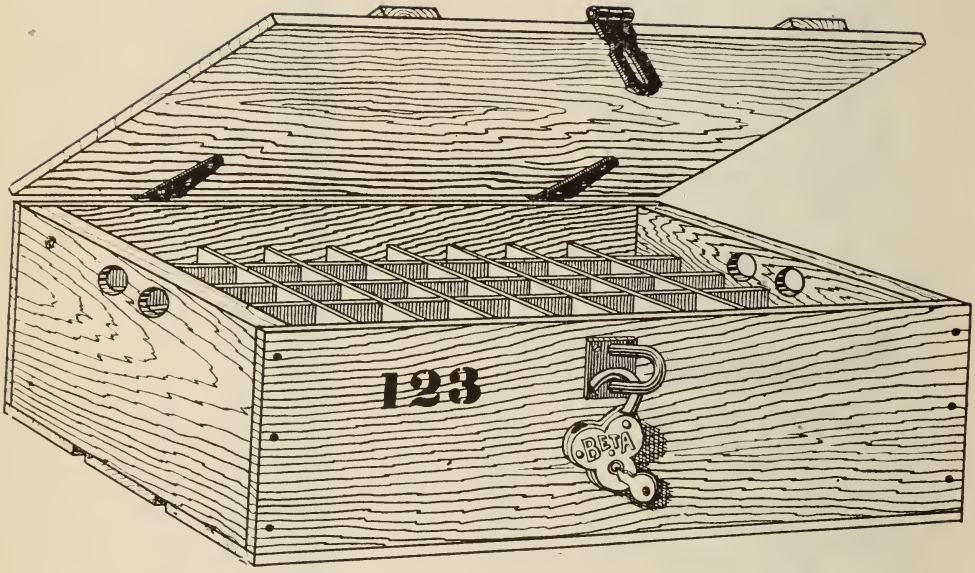

Fig. 5.

Each bottle should have a label pasted on it bearing a number or name for each cow. Two coatings of white shellac over the label will prevent it soaking off when the bottles are washed. These articles with the following form for recording the weights of milk, make up the outfit required.

INDIVIDUAL COW RECORDS.

For 30 days ending .....

Name .....

P. O. .....

Province .....

DESCRIPTION OF COWS.					3 DAYS WEIGHINGS OF MILK.				Total Pounds of Milk Calculated.	BUTTER FAT.	
NAME.	BREED.	No.	Age.	Date of Last Calf.						Per Cent.	Total Pounds.
		1			M						
					E						
		2			M						
					E						
		3			M						
					E						
		4			M						
					E						
		5			M						
					E						
		6			M						
					E						
		7			M						
					E						
		8			M						
					E						

One of the blank record forms should be posted in the stable, on a board with a pencil attached, in a convenient and well lighted place; the spring scale should be suspended close by.

The weight of milk may be taken and recorded in the morning and evening of three days during the month at intervals of ten days (for instance, January 10th, 20th and 30th), and the totals of these six weights multiplied by ten will give quite closely the total yield of milk for thirty days.

TAKING SAMPLES.

Immediately after weighing each cow's milk, pour it into another pail, and while the milk is still in motion take one dip of milk with the small dipper provided for the purpose and pour it into the sample bottle, which bears the number corresponding to the cow. This will make six dips of milk in each bottle during the month, from the six different milkings of each cow. The cap should be kept well screwed on the bottle, to prevent evaporation.

Caution.—Keep the box containing the test samples undisturbed in a cool place and always safely locked to prevent access of children or other inquisitive persons, as the preservative to be used in the milk is generally a DEADLY POISON.

Mix the milk in the test bottles every time a fresh sample is added, by giving the bottle a rotary motion.

One preservative tablet should be placed in each sample bottle before the first sample of milk is taken.

If six milkings a month are to be recorded as herein advised, the percentage of fat in the composite sample may be ascertained after the sixth sample is taken, and the yield of butter fat readily calculated. To obtain the approximate yield of butter, add one-sixth the quantity of fat. Thus if the six weighings during the thirty days are 16, 15½, 16, 14½, 15 and 15 pounds respectively, the total of 92 multiplied by 10 will give 920 pounds of milk, which, testing 3·6 will yield 33·1 fat, or if one-sixth be added, a total yield of 38·6 pounds of butter for the month.

TESTING THE COMPOSITE SAMPLE.

Up to the present time no simpler or more accurate method of testing for fat has been devised than the well-known Babcock milk tester. With a little practice there is no reason why the careful farmer (or some methodical member of the household) should not do his own testing satisfactorily.

A two-bottle machine is the smallest made, and costs about $4.50. Other sizes are for 4, 6, 8, 10, 12 and 24 bottles. Where steam is available the steam turbine tester will be found the most convenient and satisfactory. About 45 pounds steam pressure is required to operate a turbine tester.

It is advisable to mix any cream that may have risen on the composite sample, by pouring the milk carefully two or three times from one bottle to another. Do not shake it, or partial churning may result. The test is worse than useless, quite misleading in fact, unless the cream is thoroughly mixed with the milk, and the sample taken is a fair average of the milk to be tested. Some samples may require to be warmed in hot water to about 110 degrees F. in order to loosen the cream which has become attached to the sides of the bottle. Should a sample be sour and thick, add a small quantity of powdered lye, mixing it in thoroughly till the curd is dissolved and the milk become fluid again.

With a 17·6 c.c. pipette take a small sample of the thoroughly mixed milk, by sucking it up slightly above the mark on the upper part of the stem. Place the forefinger quickly on the top of the pipette to retain the milk, and hold the pipette in an upright position.

Allow the excess of milk to slowly drip out, by allowing a little air to enter under the finger, until the surface of the milk stands exactly at the level of the mark or ring

on the neck of the pipette. Place the lower end of the pipette in the neck of the test bottle, not too far in, release the pressure and allow the milk to flow down the side of the neck. By holding both pipette and bottle slightly inclined, the air will be allowed to escape without bubbling and causing loss of milk. Blow the remaining drop from the pipette into the bottle. Before adding the acid, bring the milk to a temperature of 60 degrees F.

ADDING THE ACID.

Procure good commercial sulphuric acid, having a specific gravity of 1·82 or 1·83 Keep the acid bottle tightly closed with a glass or rubber stopper. If an acid burette or other measuring device is not used, the acid may be poured from a small mouthed earthen or glass pitcher into the 17·5 c.c. acid measure, which is usually supplied with the machine.

Great care should be exercised in handling sulphuric acid (oil of vitriol), as it is intensely corrosive and will burn the skin or clothing quickly should it come in contact with either. Any stray drops should be wiped up immediately, using plenty of water. It is a good plan to have a supply of household ammonia handy, which will help to counteract any burning of skin or clothes, if applied immediately.

Holding the test bottle containing the milk at a moderate slant, pour the 17·5 c.c. of acid in very carefully, allowing it to flow slowly down the side of the neck, and on no account to drop straight on to the surface of the milk. The acid and milk will form two distinct layers, with the acid at the bottom, showing a slight brownish colouration where they touch. Have the acid also at 60 degrees F.

The milk and acid may be mixed by giving the bottles a careful rotary motion. This must be very cautiously done to avoid shaking any curd into the neck. Continue shaking until all the clots are completely dissolved. Be careful to have the mixing thoroughly done.

WHIRLING.

When the milk and acid are thoroughly mixed, place the bottles in the machine so arranged as to balance it. If an odd number of samples are to be tested, an extra bottle filled with water may be placed in the machine to make it run smoothly. Precaution must be taken to keep the fat melted, but do not let the temperature run above 130 degrees F. Hot water may be put in the body of the tester to keep the samples warm.

The bottles should be whirled for five minutes at the speed indicated on the machine. This will vary from 700 revolutions per minute for a machine twenty inches in diameter up to 1,200, for machines of smaller diameter.

Hot water, preferably rain water or condensed steam, at a temperature of 135 degress F. must now be added to each bottle. Hard water may be used if about 10 c.c. of sulphuric acid is added to each gallon. A convenient method is to use a piece of rubber tubing, provided with a pinch cock and a glass tip like an eye dropper, leading from the hot water vessel placed slightly higher than the machine. Add enough water to bring the mixture up to the base of the neck and whirl for one minute. Then carefully add more water to about the 8 or 9 per cent mark on the neck of the test bottle and whirl for another minute. The fat should be quite clear and golden in colour when the test is finished. If the fat is very light coloured and there are specks of curd, use a trifle more acid, as it is probably weak. If the fat appears burnt or cloudy, use slightly less acid, and see that the temperatures of milk and acid are not too high.

READING THE TEST.

Hold the bottle level with the eye and perfectly upright. With a pair of dividers measure the extreme limits of the fat column: place one point on the zero mark, when the mark on the scale touched by the other point will indicate the percentage of fat.

Each large space on the graduated neck numbered 1, 2, &c., up to 10, represents one per cent of fat. Each small division represents two-tenths of one per cent. Thus, if reading without dividers and the top of the fat column is at 7·2 with the bottom at 3·3 the sample tested contains 3·9 per cent of fat. If there are many readings to take, keep the fat melted by placing the bottles in water at 130 degrees F. reaching to the top of the fat.

The bottles should be emptied before the fat solidifies, and always kept perfectly clean. A suitable brush may be obtained for cleaning the necks. Hot water and some common shot will scour the lower part of the bottle.

GENERAL.

It has been suggested in these pages as well as in other literature on the subject published by the Dairy Commissioner's Branch, that the weight of each cow's milk should be recorded on three days only during every month. We believe that a larger number of farmers will be induced to take up the work on this basis, than if more frequent weighings were proposed. At the same time we believe most fully that the owner of a herd will be well paid for making daily records. By noting daily fluctuations in the weight of milk, the matter is forced on his attention and a study of the causes naturally follows. Those who take an intelligent interest in the work on the three days a month basis will soon see the advantage of more frequent weighing. It does not follow that the milk need be sampled for testing every time when it is weighed daily.

It will be of no use to the owner of a herd to simply weigh and test the milk of his cows. Intelligent action must follow in the breeding and selection of animals. The feeding question must also be studied carefully, and it is in this connection that daily weighings will be of great service. Farmers should not invest in thoroughbreds unless they are satisfied that there is ' performance with pedigree,' and that behind each animal there is a line of ancestry with good milking records to their credit.

Copies of this bulletin may be secured, gratis, by addressing the Dairy Commissioner, Ottawa, Ont.

DEPARTMENT OF AGRICULTURE
DAIRY COMMISSIONER'S BRANCH
OTTAWA, CANADA

CREAMERY COLD STORAGE

BY

J. A. RUDDICK,
Dairy Commissioner.

BULLETIN No. 10.

DAIRY COMMISSIONER'S SERIES

Published by direction of the Hon. SYDNEY A. FISHER, Minister of Agriculture, Ottawa, Ont.

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